



8. ATRİYAL FİBRİLASYON ZİRVESİ 2019
8 - 9 Şubat 2019 Xanadu Hotel, Belek, Antalya

VENTRİKÜLER TAŞIKARDİ ABLASYONU DİĞER YÖNTEMLER

(Scar dechanneling, homojenizasyon vs.)

Dr. Umuttan Doğan
Akdeniz Üniversitesi

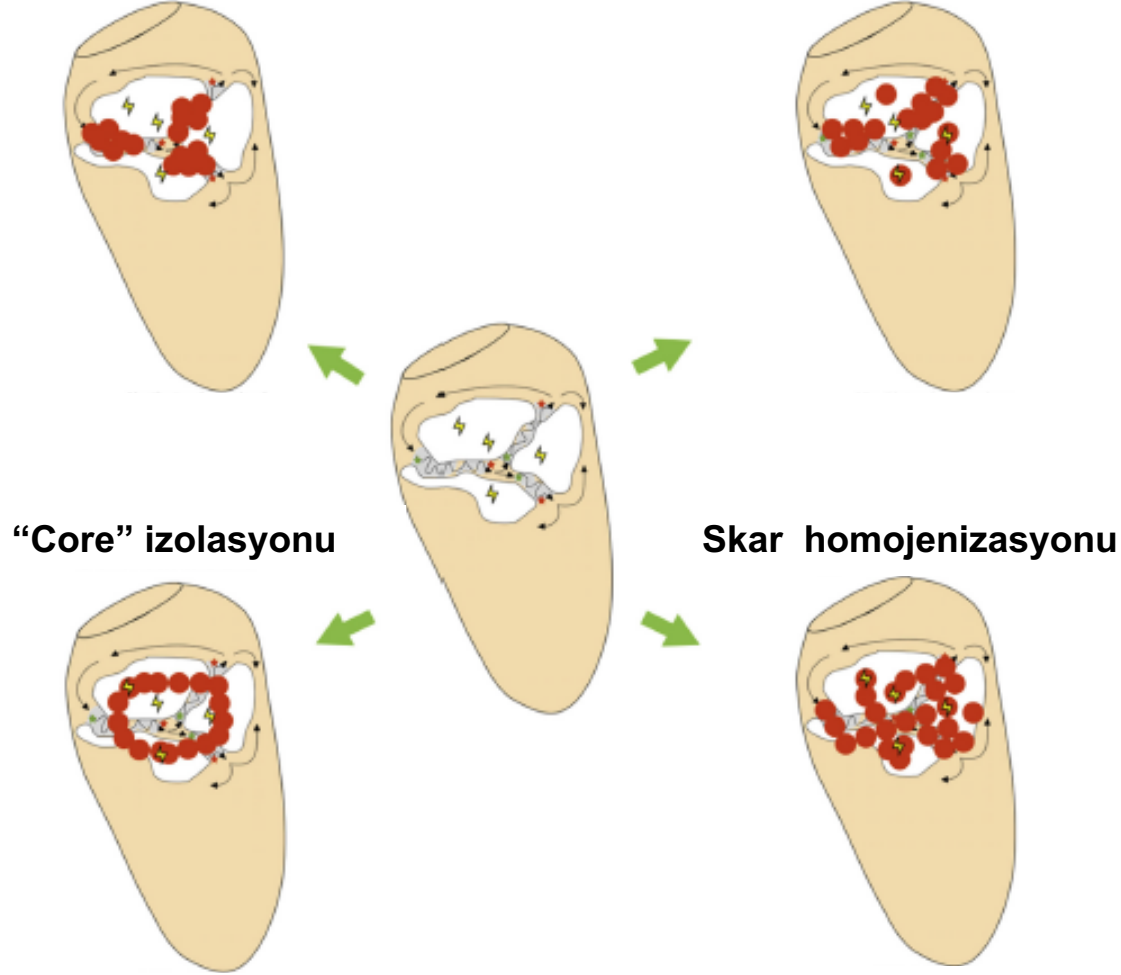
Konvansiyonel Yaklaşım Yeterli Değil

- Ventriküler taşikardileri uyarmak zor olabilir (~%15)
- Programlı stimülasyonla klinik VT uyarılmayabilir
- Programlı stimülasyonla tüm substratlar ortaya çıkmayabilir
- Ventriküler taşikardilerin sadece %30u hemodinamik olarak stabil

Substrat Ablasyonu

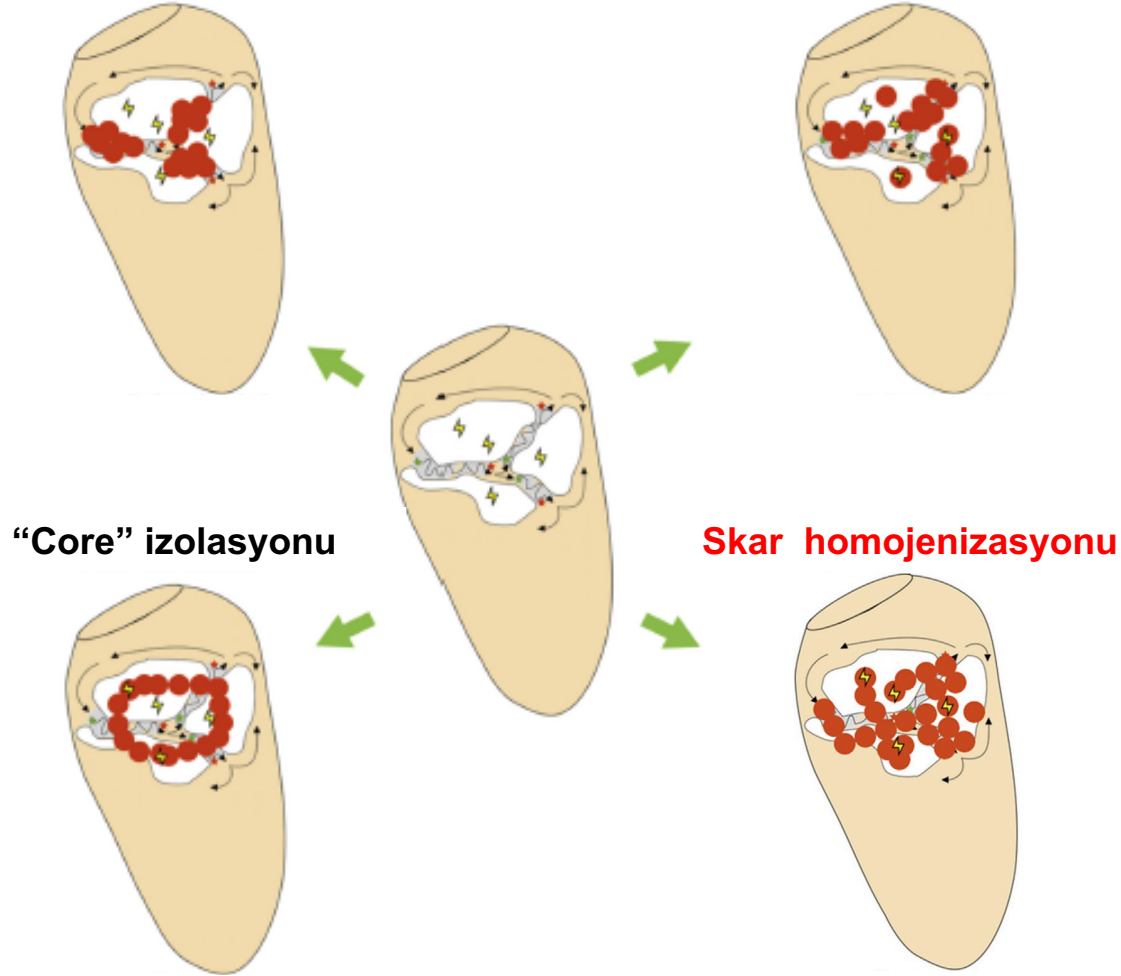
Skar “dechanneling”

Geç Potansiyel ve LAVA Ablasyonu



Skar “dechanneling”

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Scar Homojenizasyonu

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Heart Rhythm Disorders

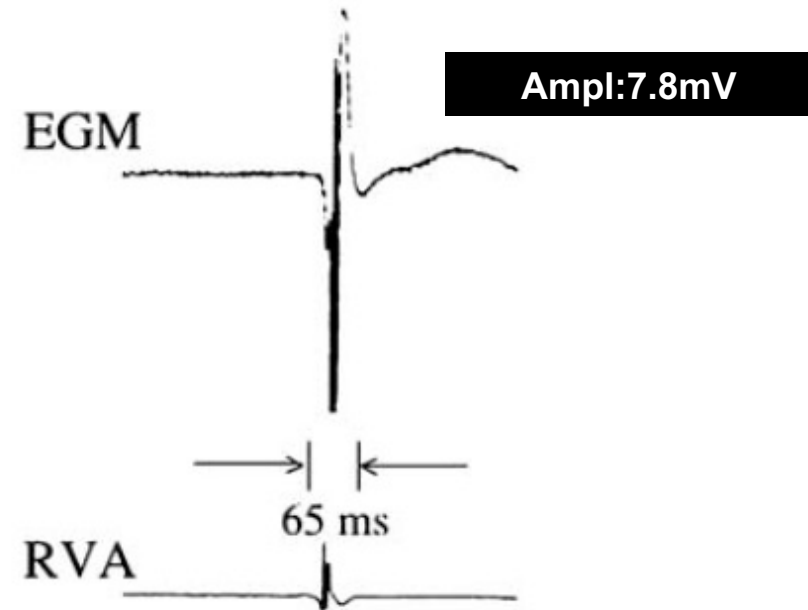
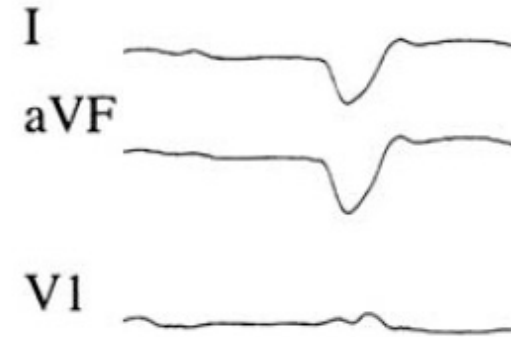
Endo-Epicardial Homogenization of the Scar Versus Limited Substrate Ablation for the Treatment of Electrical Storms in Patients With Ischemic Cardiomyopathy

Luigi Di Biase, MD, PhD,*†‡ Pasquale Santangeli, MD,*‡ David J. Burkhardt, MD,*§ Rong Bai, MD,* Prasant Mohanty, MBBS, MPH,* Corrado Carbucicchio, MD,|| Antonio Dello Russo, MD,|| Michela Casella, MD,|| Sanghamitra Mohanty, MD,* Agnes Pump, MD,*¶ Richard Hongo, MD,§ Salwa Beheiry, RN,§ Gemma Pelargonio, MD,# Pietro Santarelli, MD,# Martina Zucchetti, MD,|| Rodney Horton, MD,* Javier E. Sanchez, MD,* Claude S. Elayi, MD,** Dhanunjay Lakkireddy, MD,†† Claudio Tondo, MD,|| Andrea Natale, MD*†§

Austin, Texas; Foggia, Milan, and Rome, Italy; San Francisco, California; Pecs, Hungary; Lexington, Kentucky; and Kansas City, Kansas

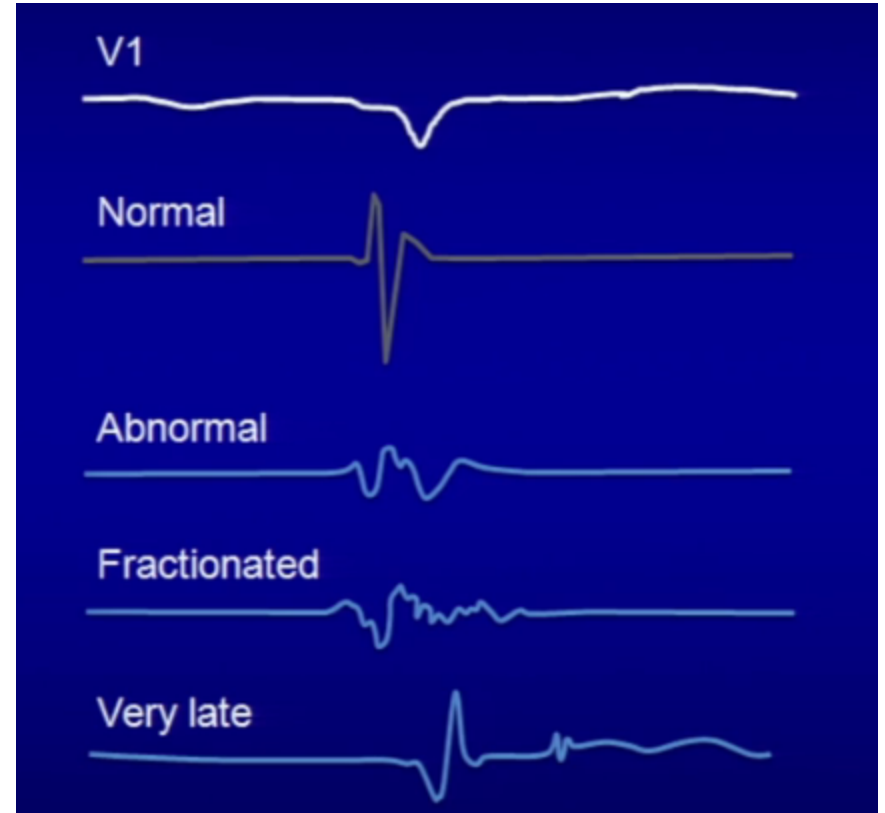
Normal Elektrogram

- Amplitüdü ≥ 1.5 mV
- Süresi 70 msn altında
- Amplitüd/süre oranı >0.045
- 3 veya daha az sayıda
- keskin
- diskret defleksiyonlar



Anormal Elektrogram

- Sinüs veya Pace ritmi sırasında:
- 3'ten fazla defleksiyonu olan
- Amplitüd < 1.5 mV
- Süresi 70 msn altında



Akut Ablasyon Sonlanım Noktası

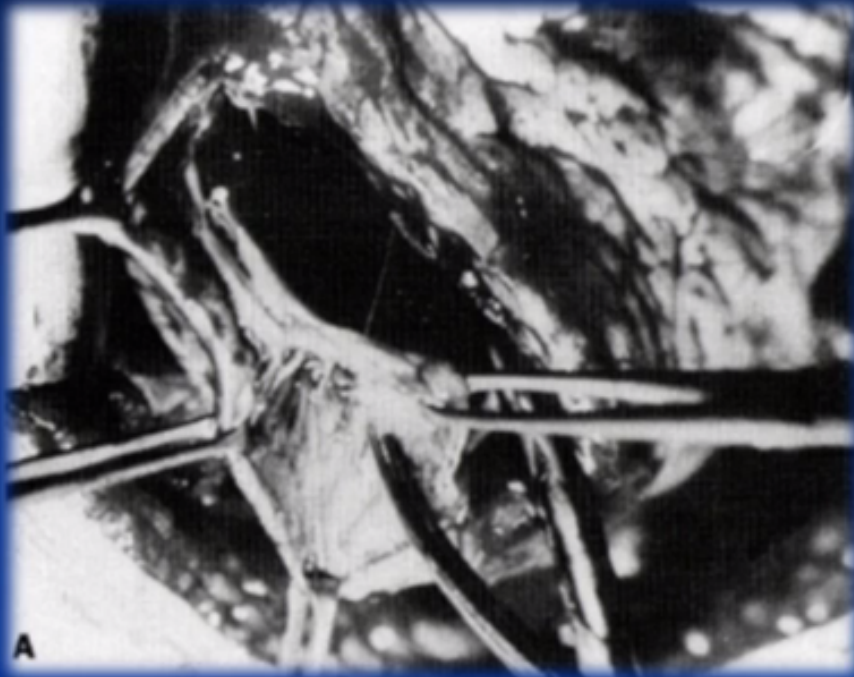
- Anormal EGM'nin kaybolması
- 20 mA “output” ve 10 msn “pulse width” ile pacing sırasında lokal “capture”in kaybolması

40. yıl

Endocardial excision: a new surgical technique for the treatment of recurrent ventricular tachycardia.

M E Josephson, A H Harken and L N Horowitz

Circulation. 1979;60:1430-1439



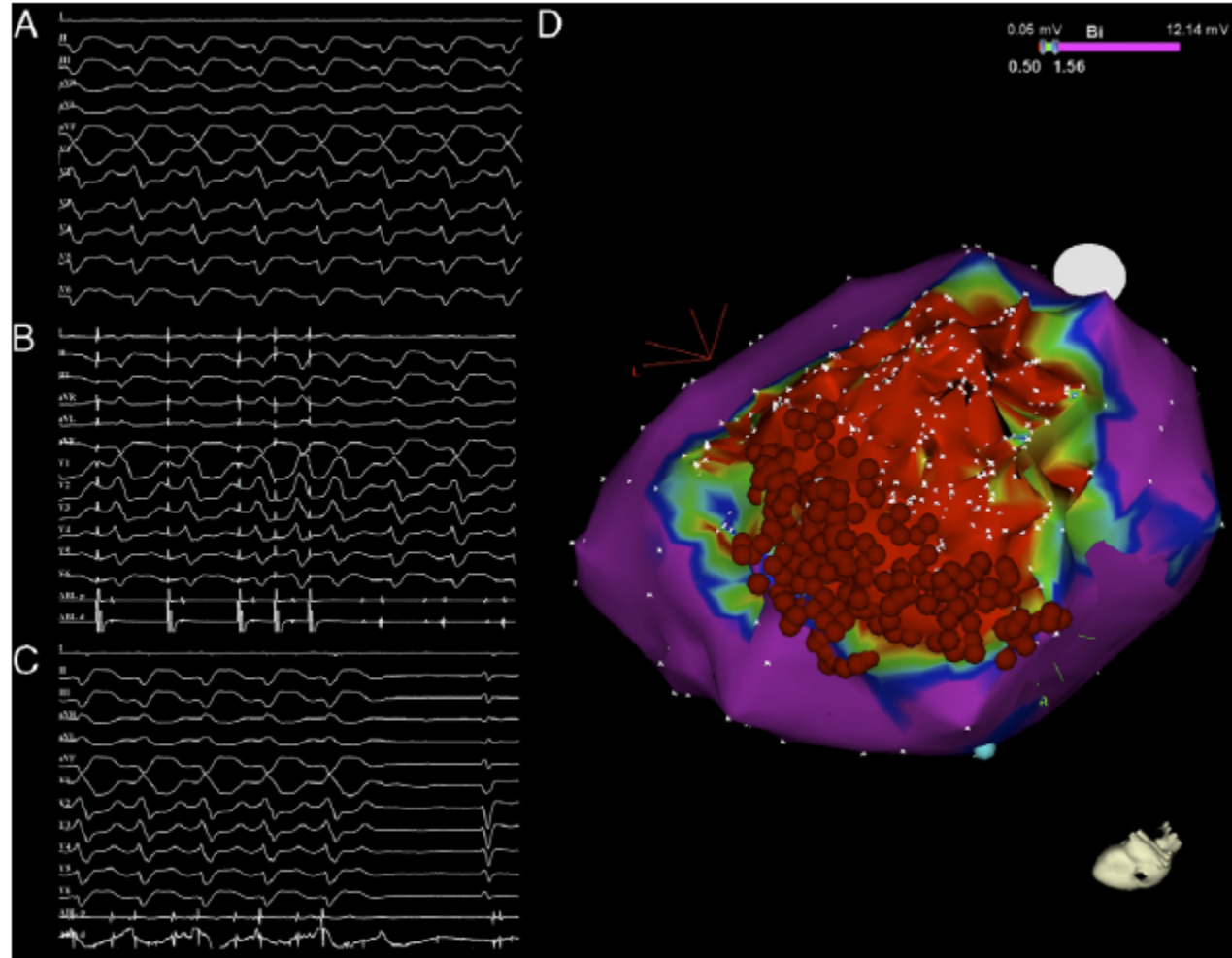
Standart Substrat Ablasyonu

YÖNTEM

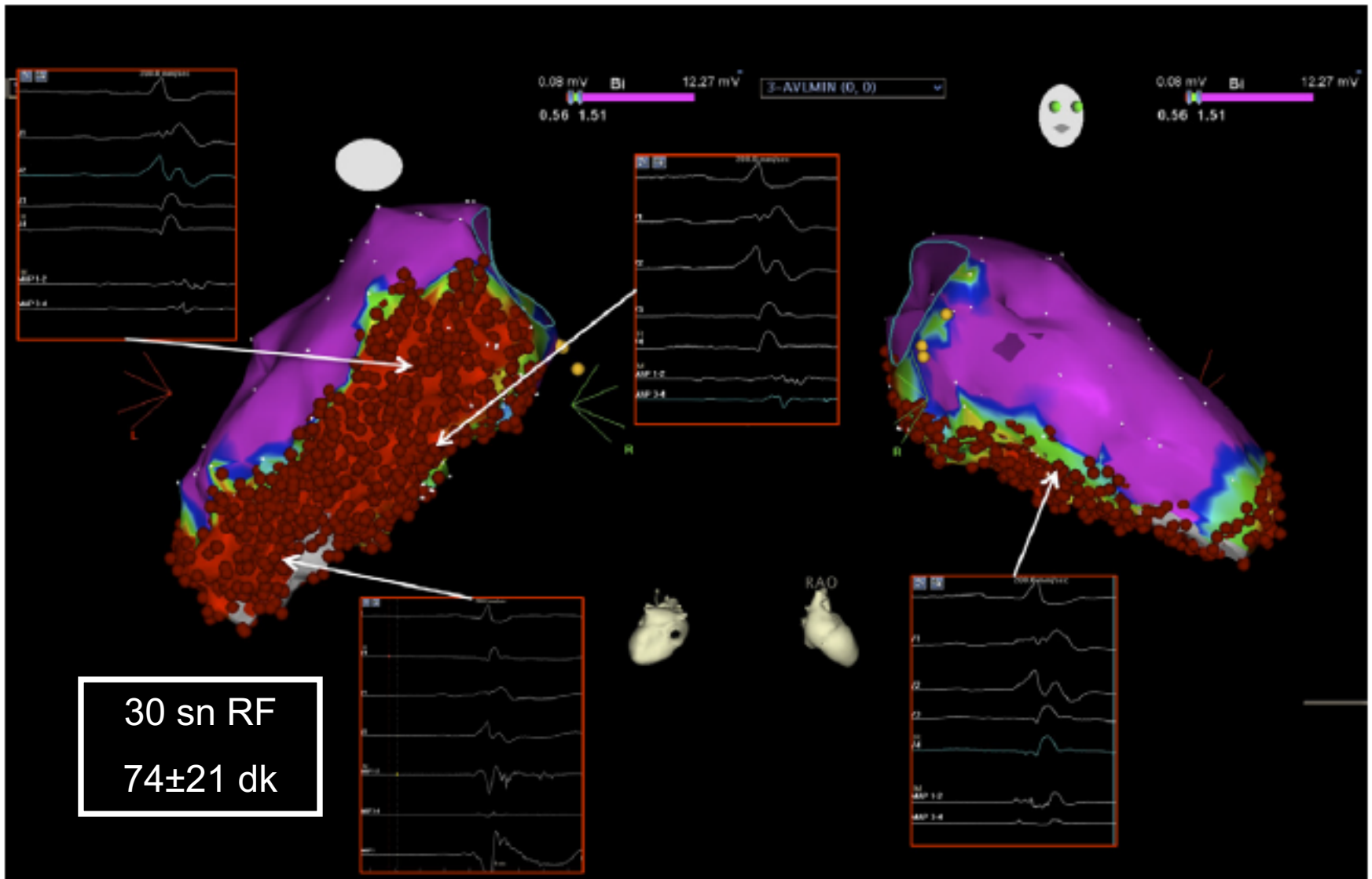
- Pace mapping
- Aktivasyon haritalama
- Entrainment

SONLANIM NOKTASI

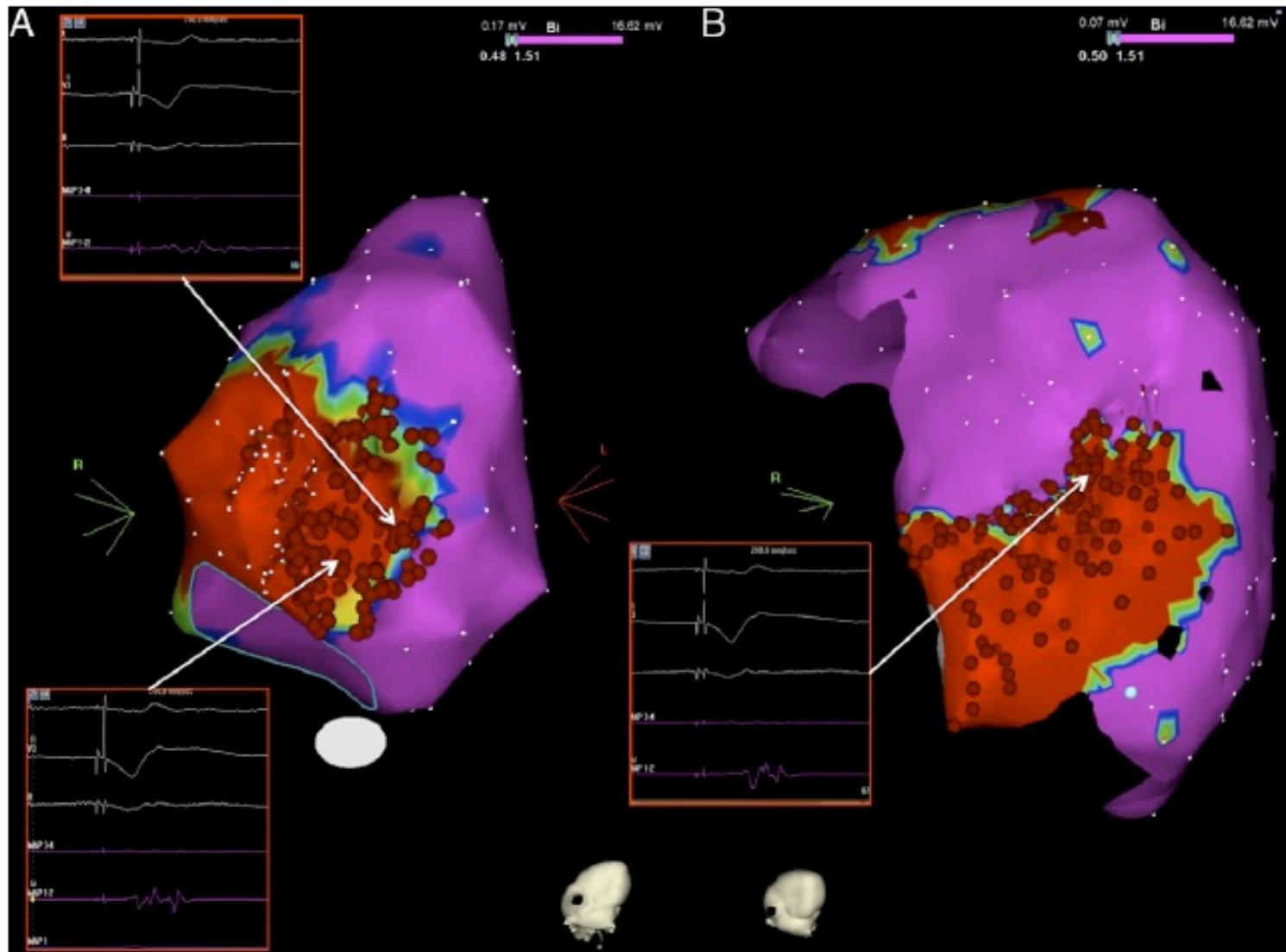
- VT'nin sonlanması
- VT indüklenememesi



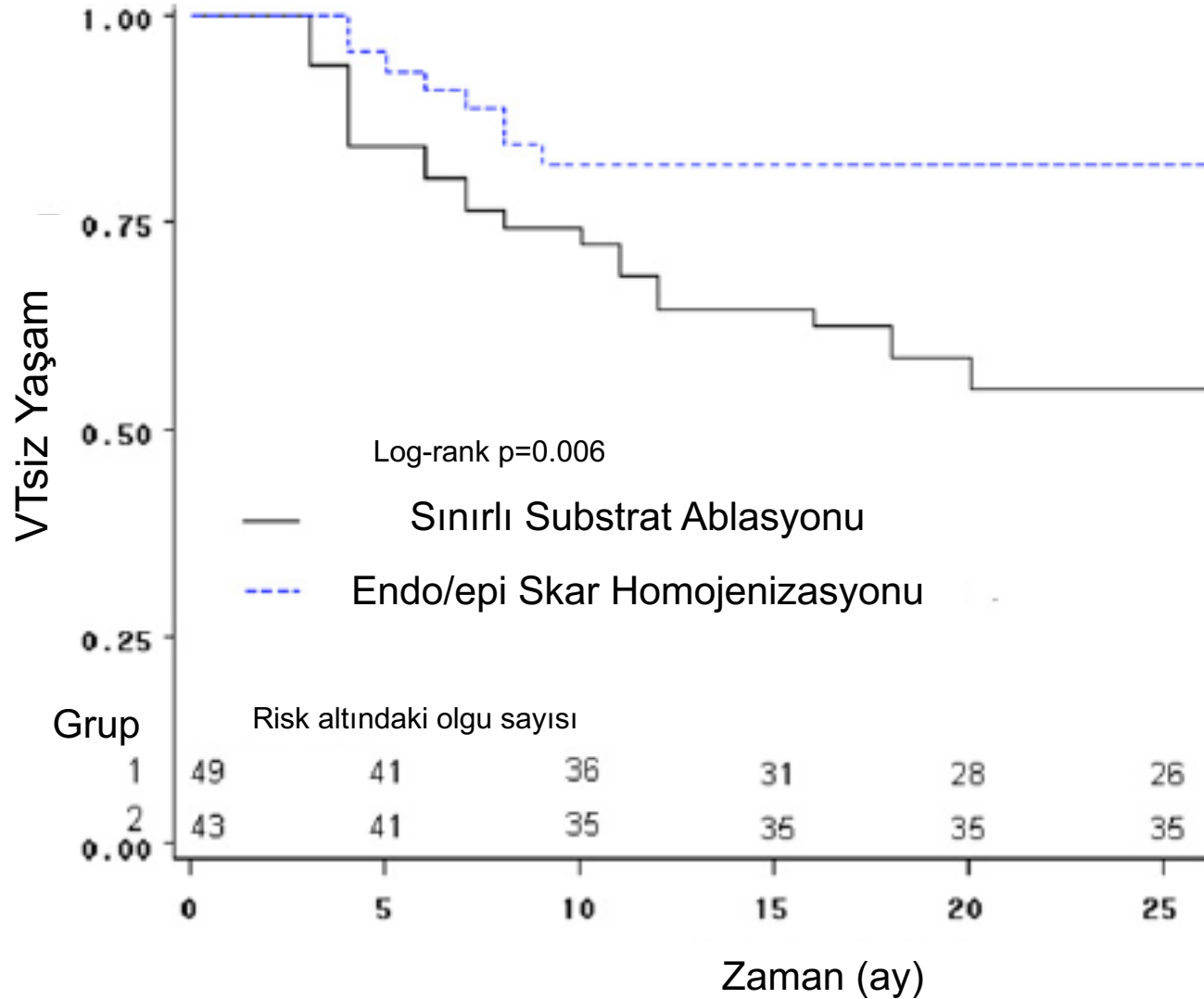
Skar Homojenizasyonu



Endo/Epi Skar Homojenizasyonu



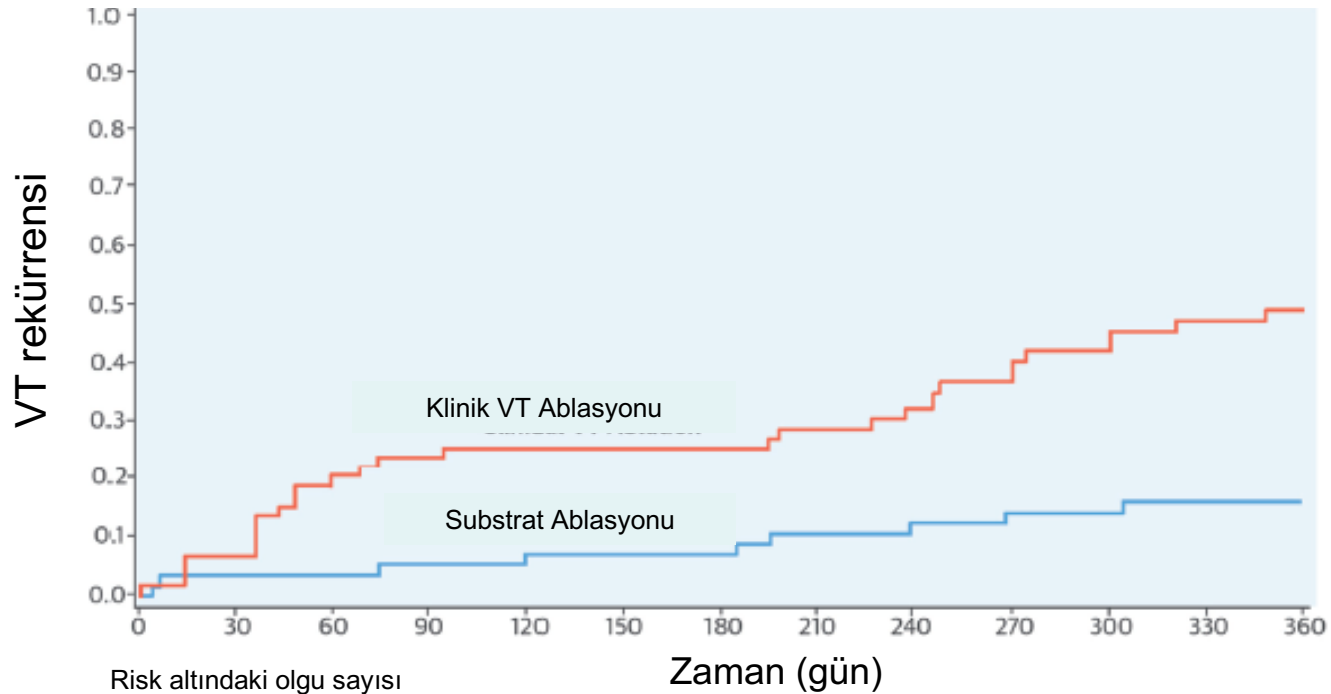
Takip



Ablation of Stable VTs Versus Substrate Ablation in Ischemic Cardiomyopathy



The VISTA Randomized Multicenter Trial



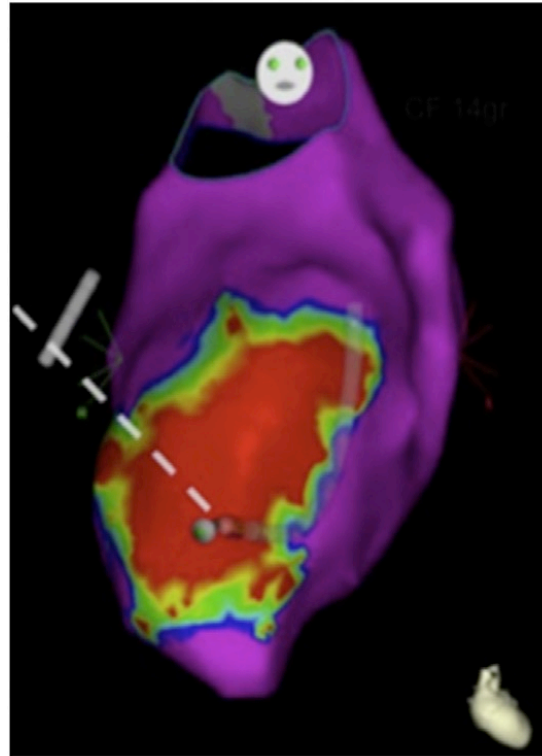
Ablasyon Stratejisi

Substrat Ablasyonu	58	56	56	55	55	54	54	52	51	50	50	49	49
Klinik VT Ablasyonu	60	56	48	46	45	45	45	43	41	38	35	32	31

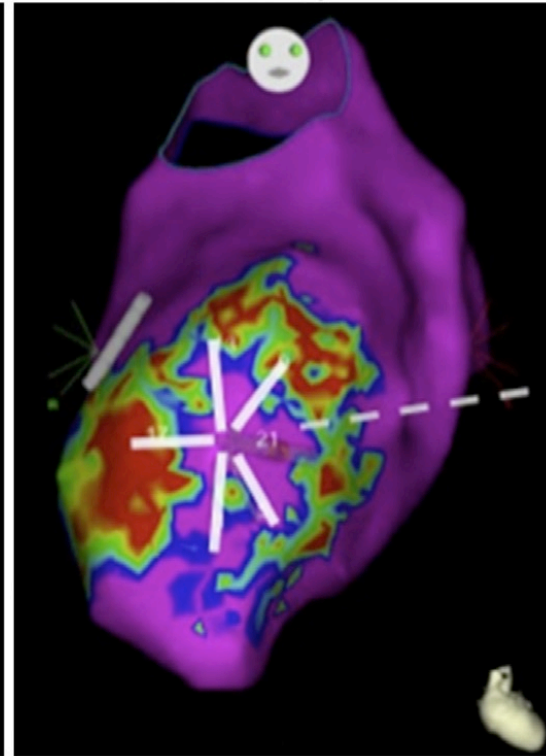
Sınırlılıklar -1-

- Konvansiyonel yöntemde kritik devre tanımlanırken, bu yöntemde direkt substrat hedefleniyor
- Optimal EGM değerlendirme yöntemi
(standart kateter/multipolar kateter??)
- Anormal EGM tanımında (sinüs ritmi/pace ritmi?)
- Efektif lezyon için tanımlanmış sonlanım noktası yok
- Tekrar haritalandırma gerekiyor (rezidü anormal EGM)

Thermocool

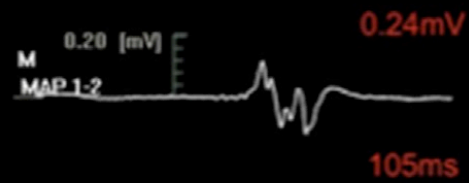


Pentaray



Scar

Thermocool



Pentaray



Sınırlılıklar -1-

- Konvansiyonel yöntemde kritik devre tanımlanırken, bu yöntemde direkt substrat hedefleniyor
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- Tekrar haritalandırma gerekiyor (rezidü anormal EGM)

Sınırlılıklar -2-

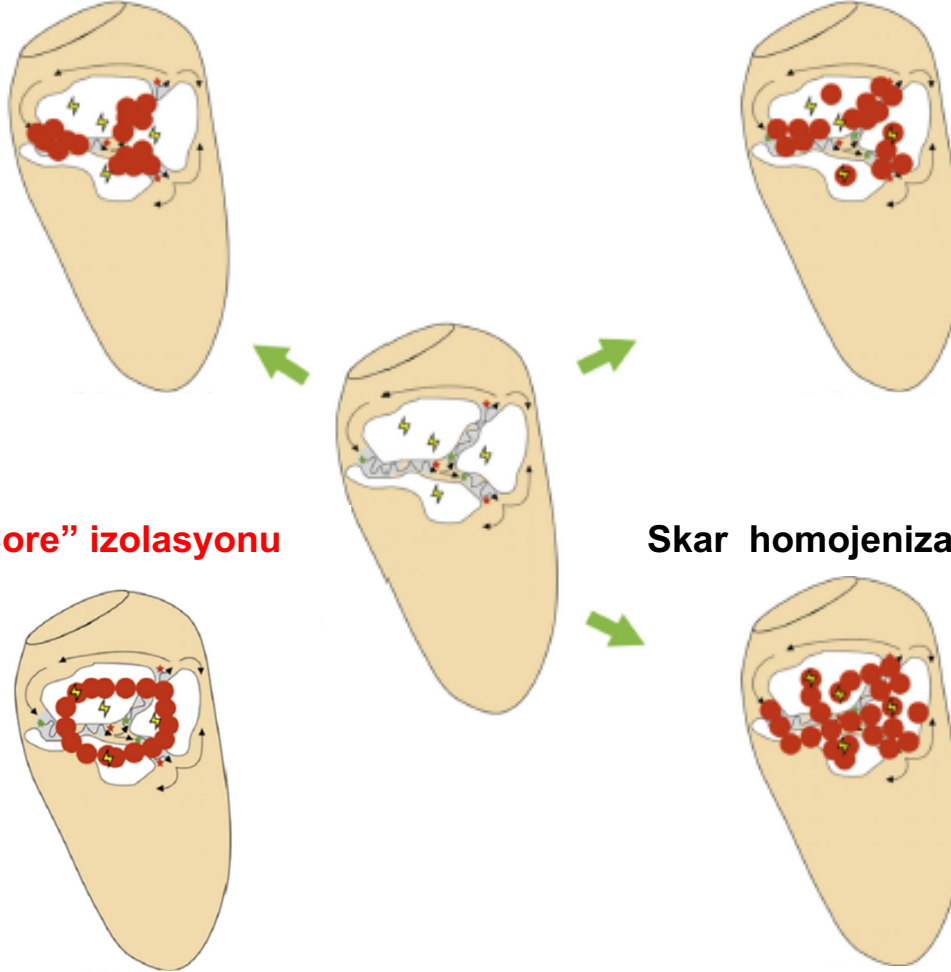
- Anormal EGMleri tamamen ortadan kaldırmak zor
- Bystander bölgelerin ablasyonu
- Substratı geniş, EF çok düşük, kardiyak rezervi az hastalar??
- Klinik VT'nin oluşumundan sorumlu bölgeler hedeflenmeli

Skar “dechanneling”

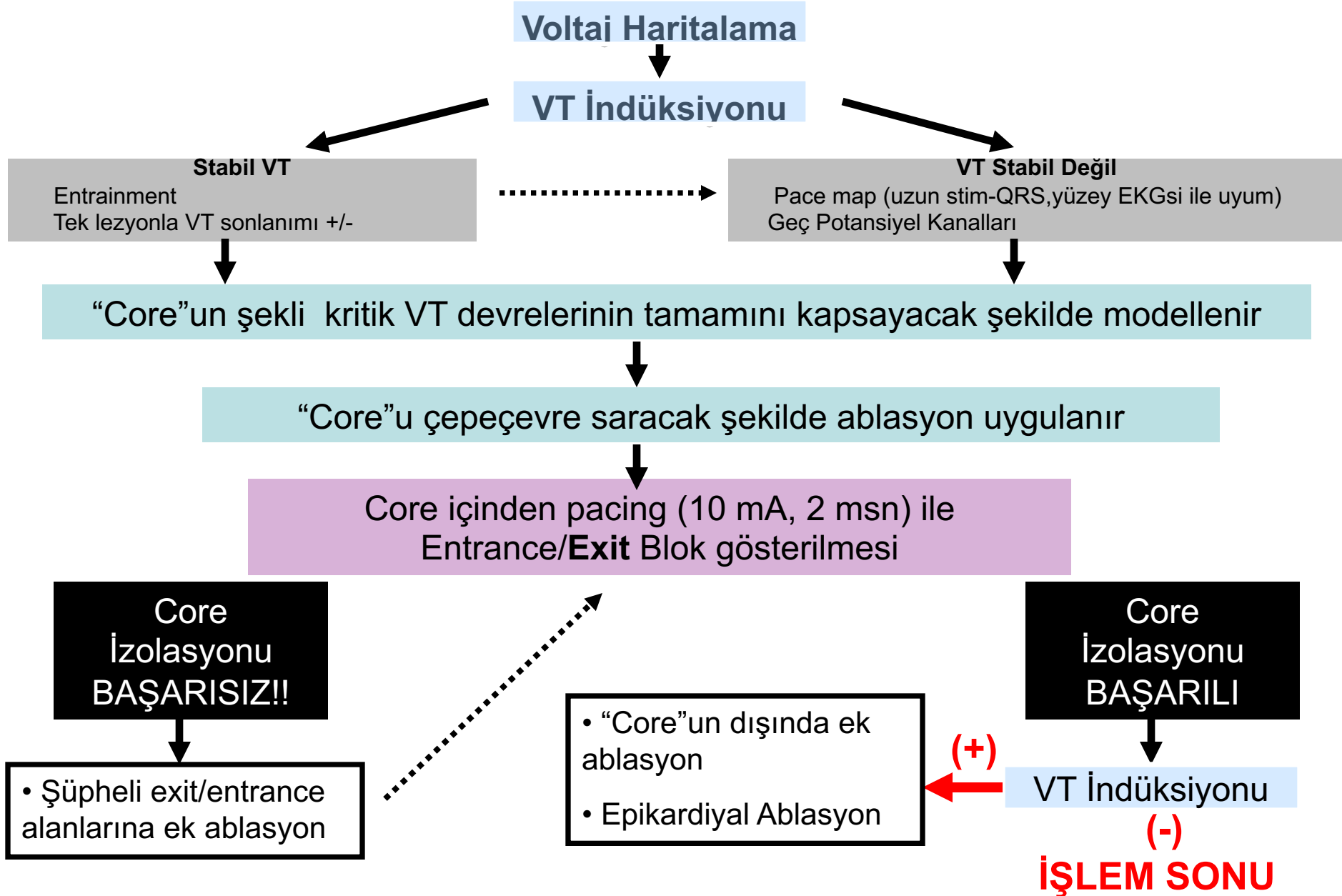
Geç Potansiyel ve LAVA Ablasyonu

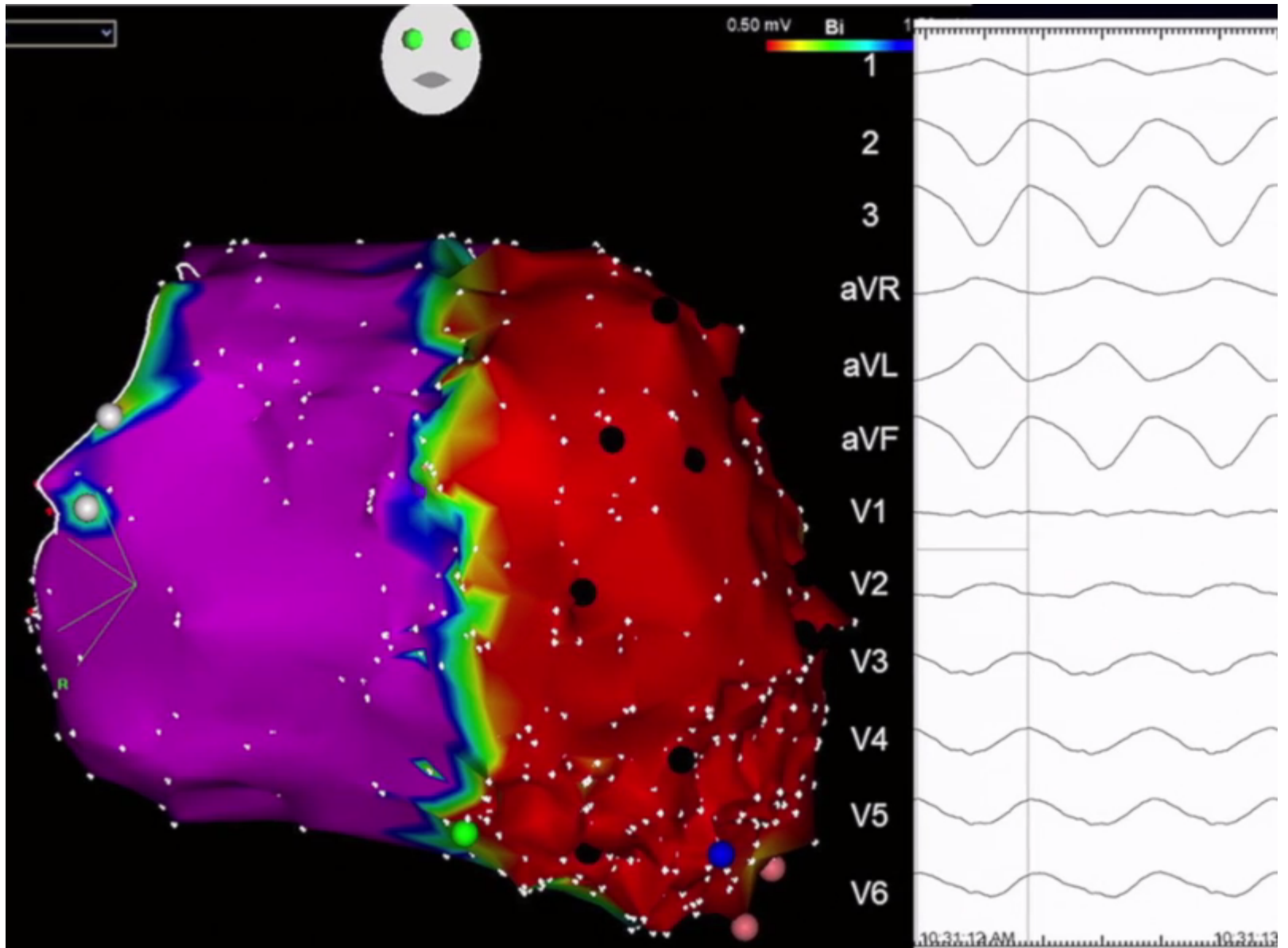
“Core” izolasyonu

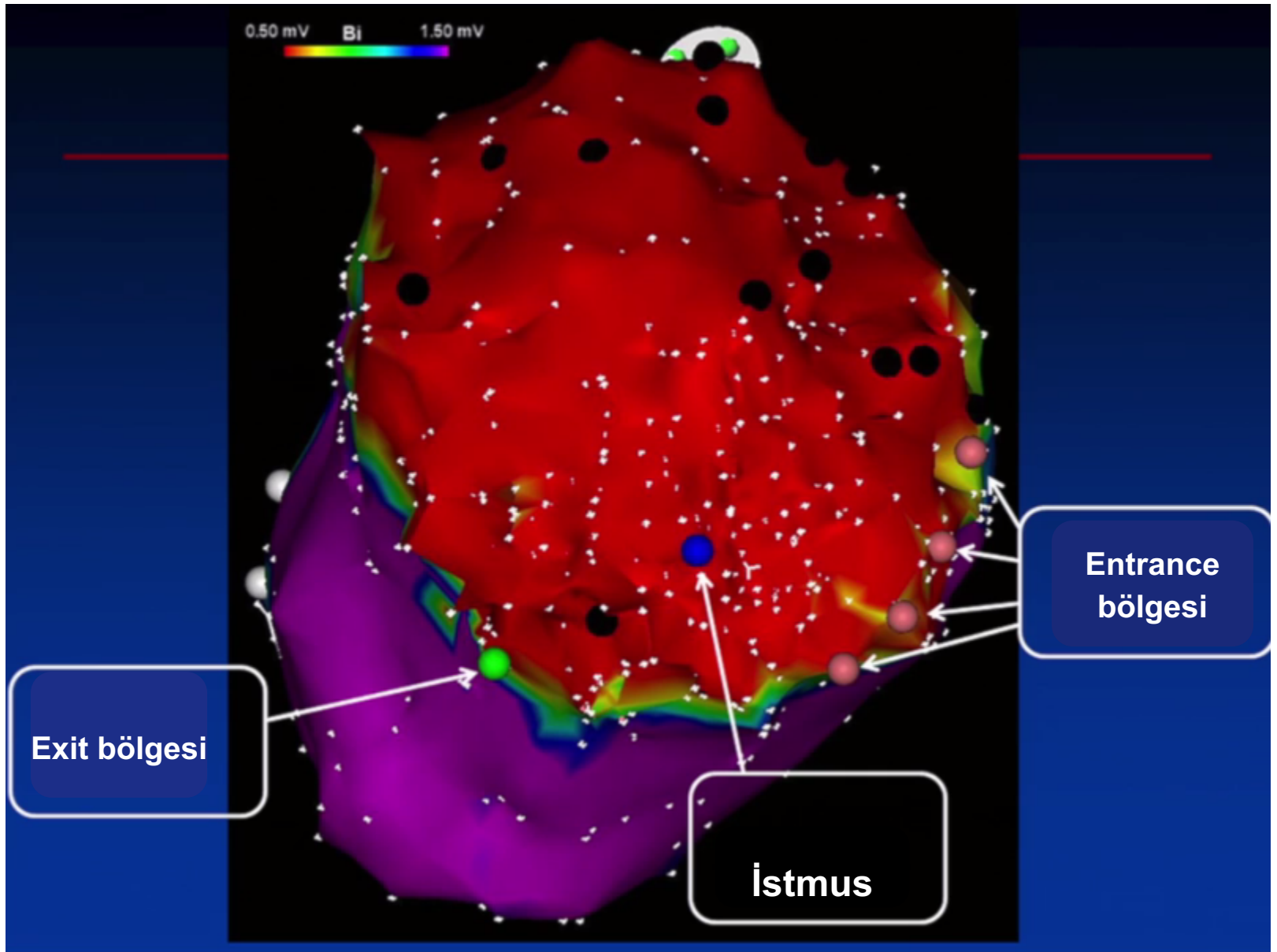
Skar homojenizasyonu

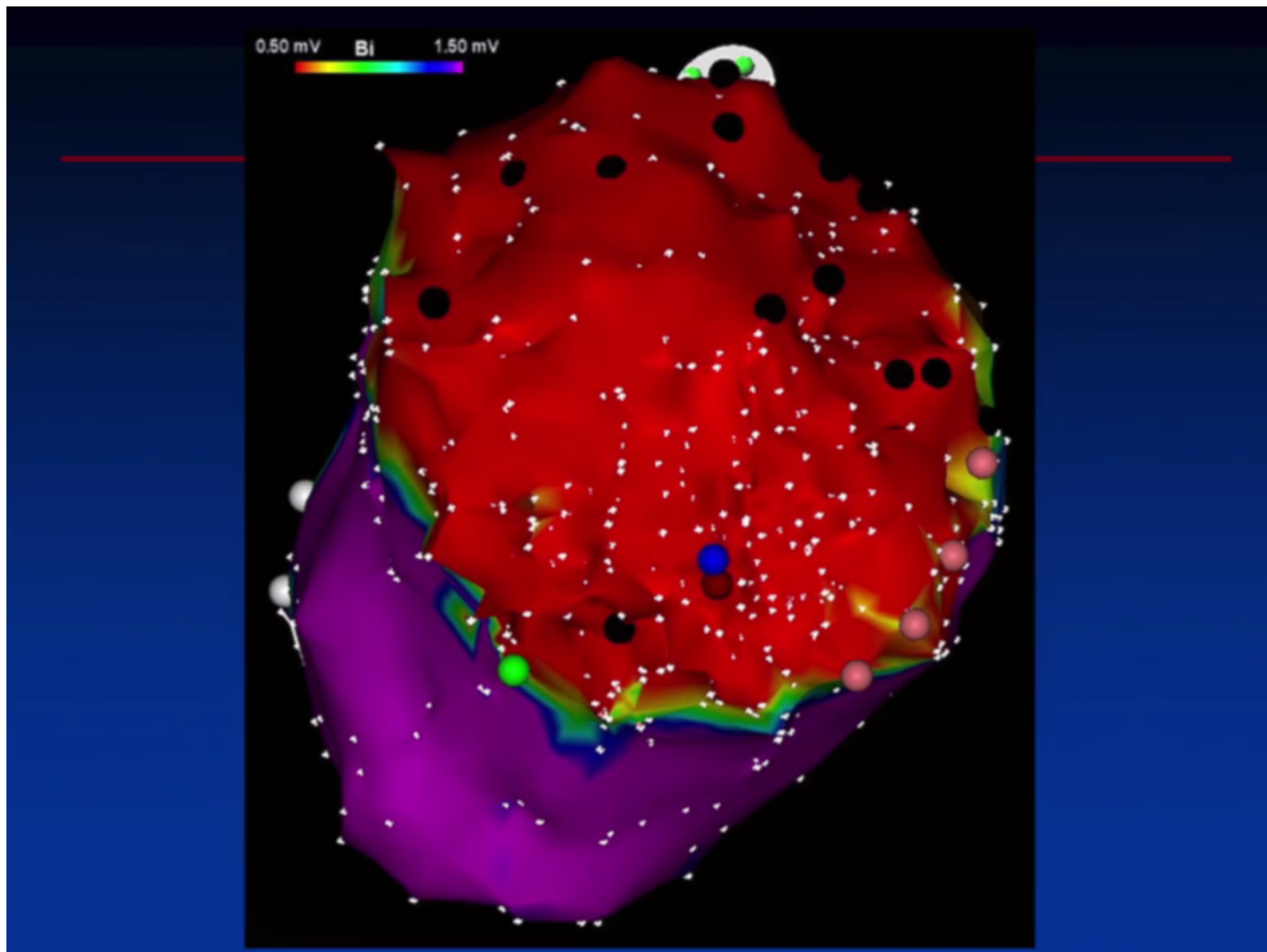


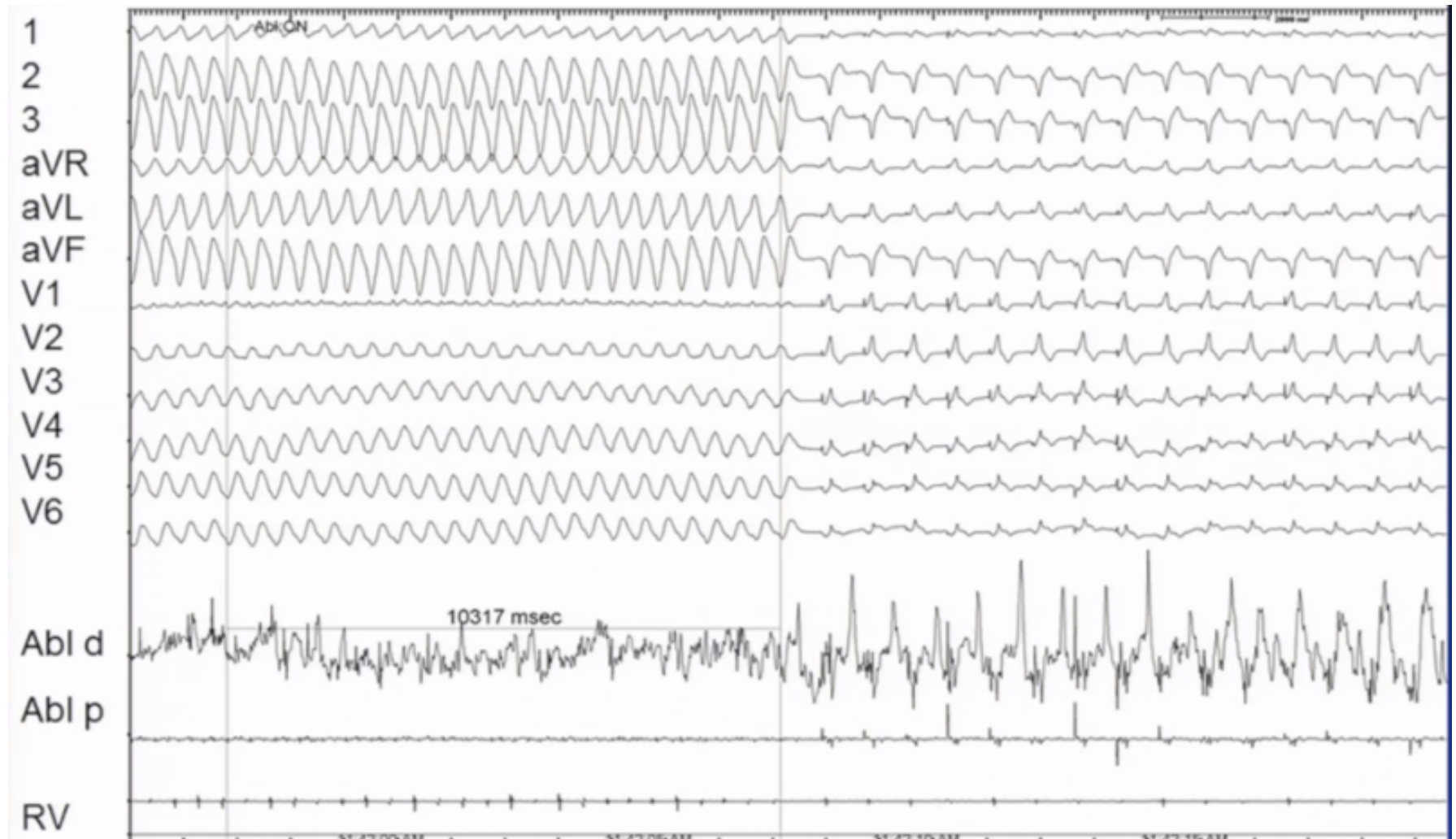
“CORE” (Box) İzolasyonu

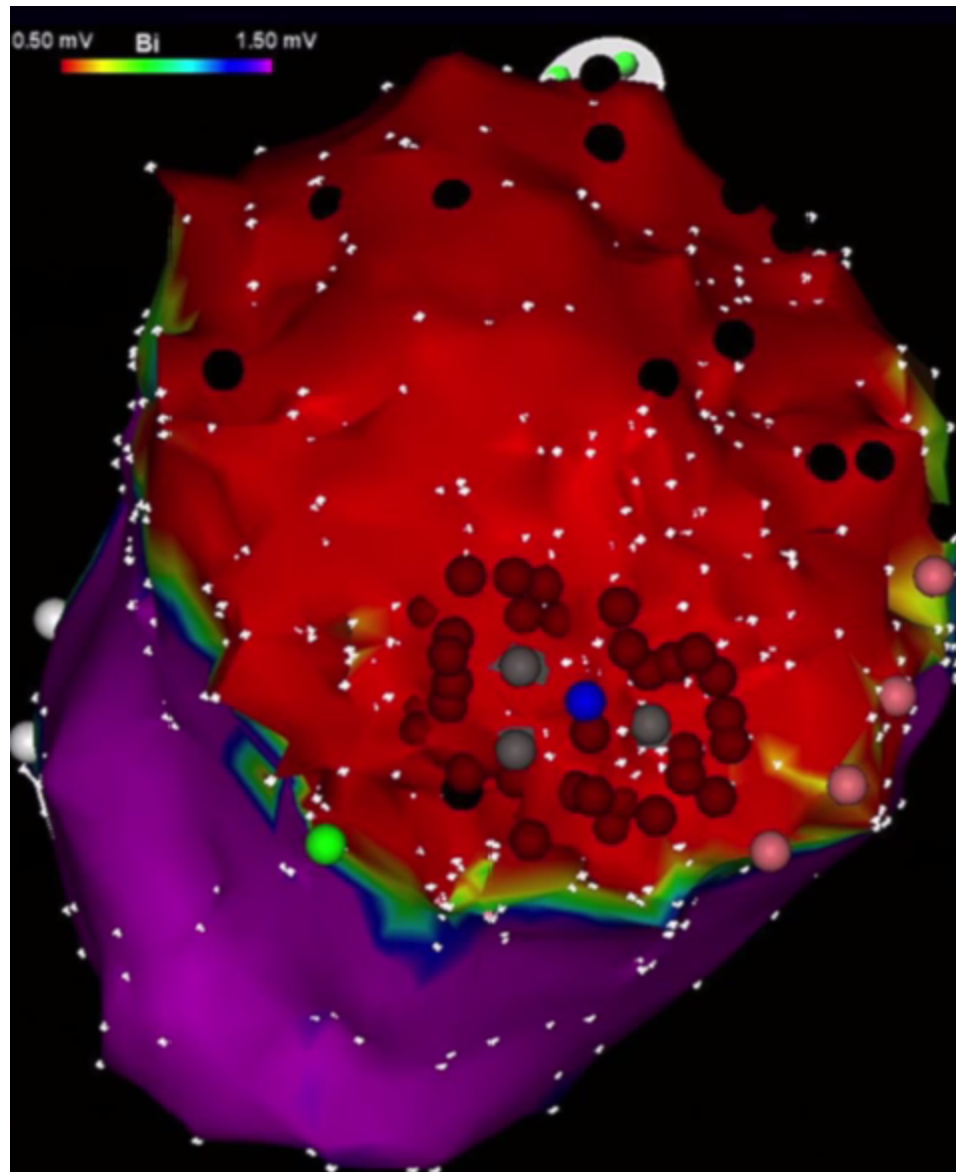


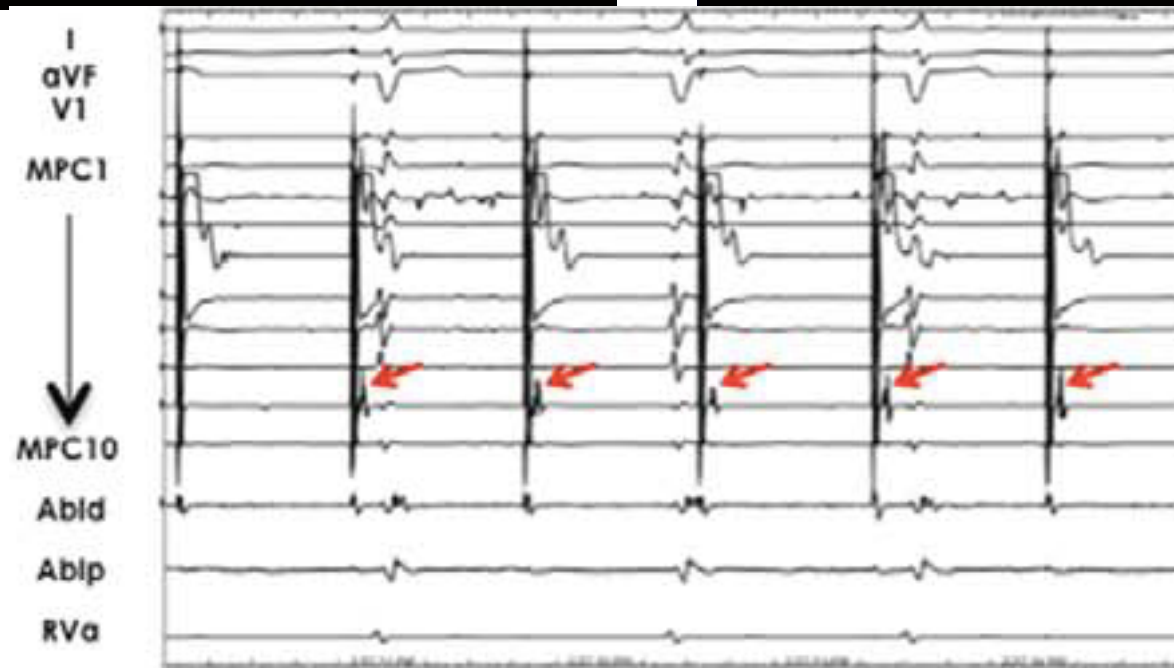
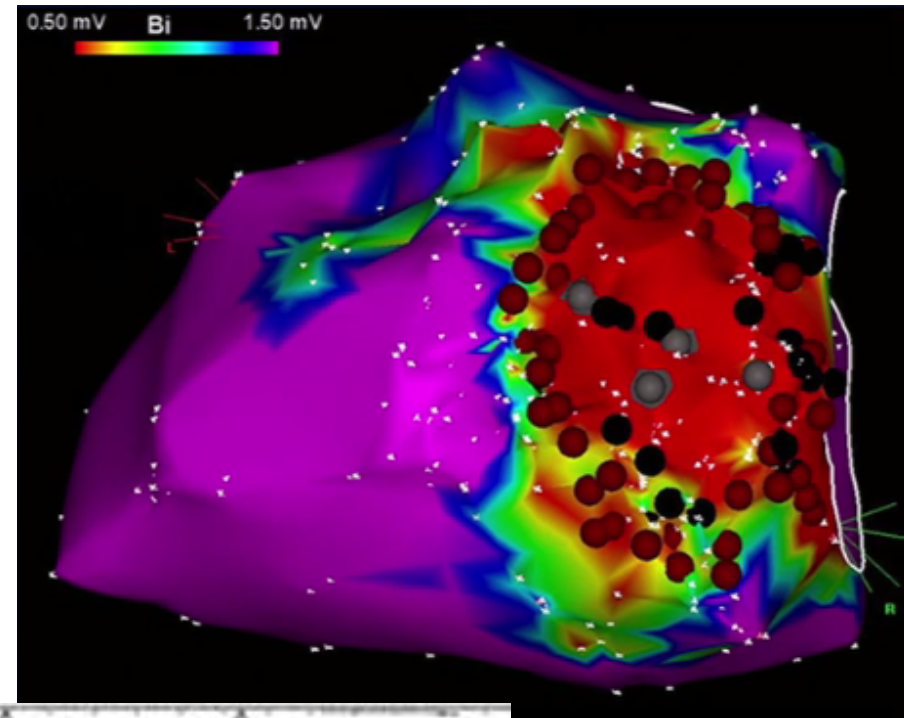
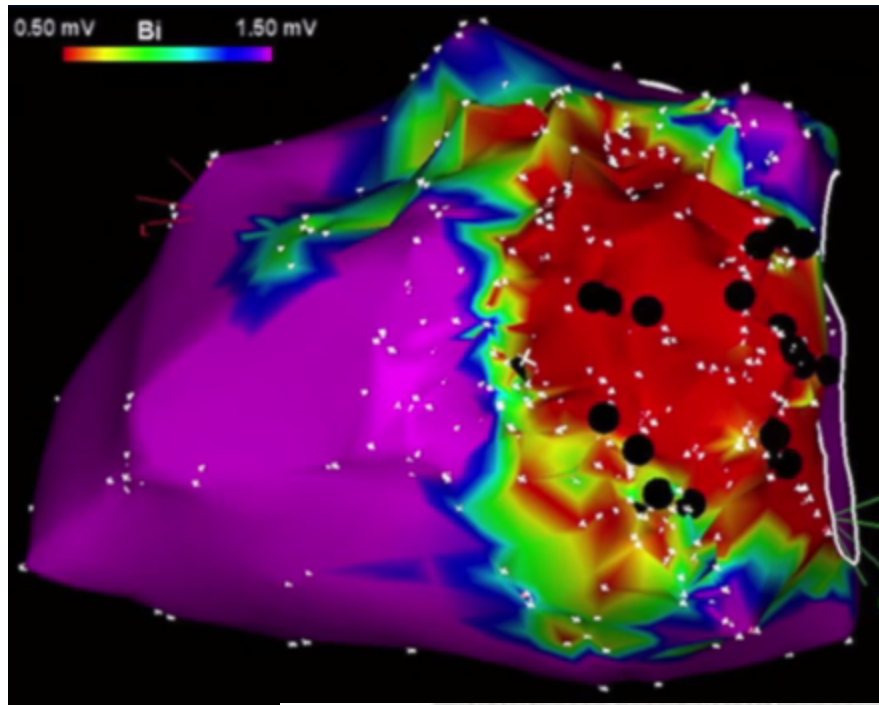




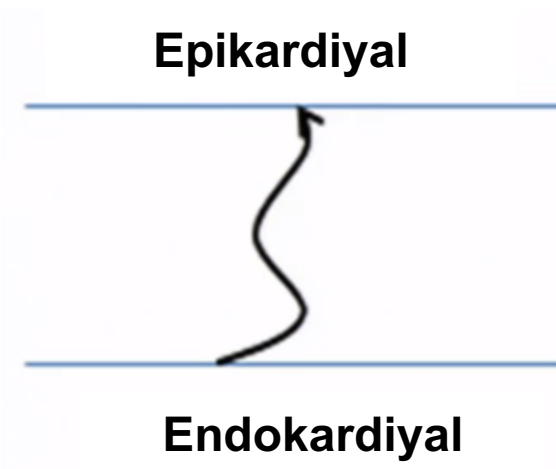






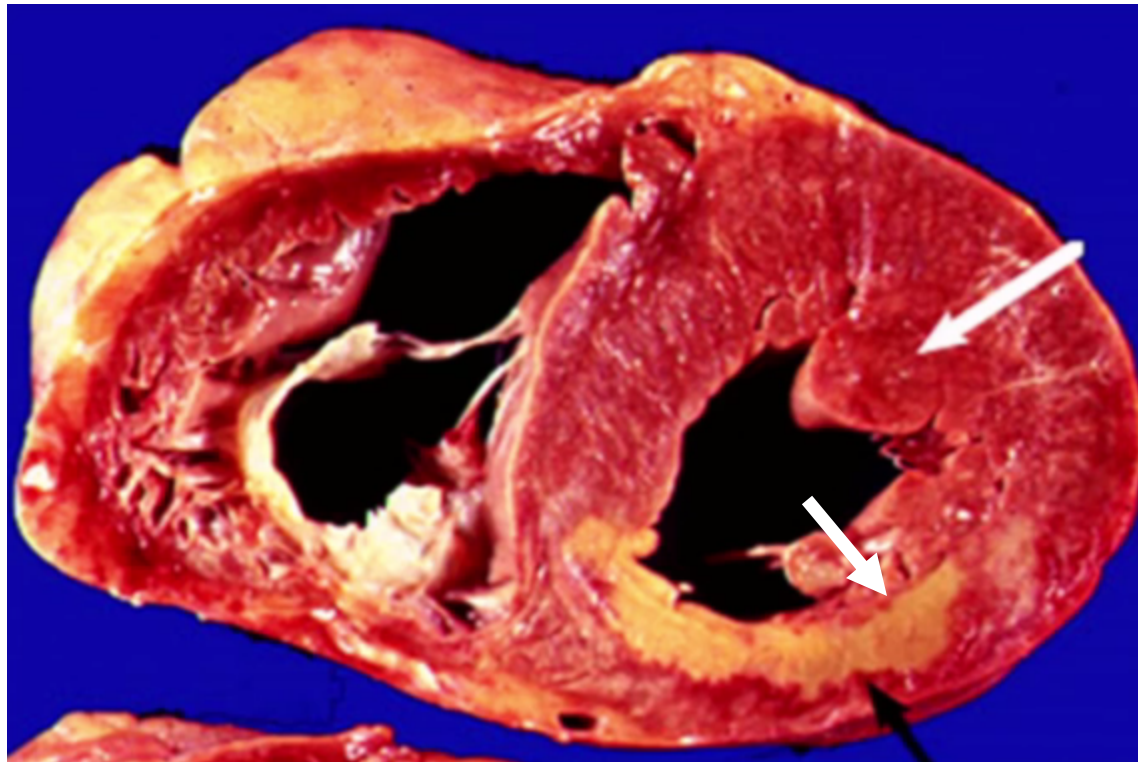
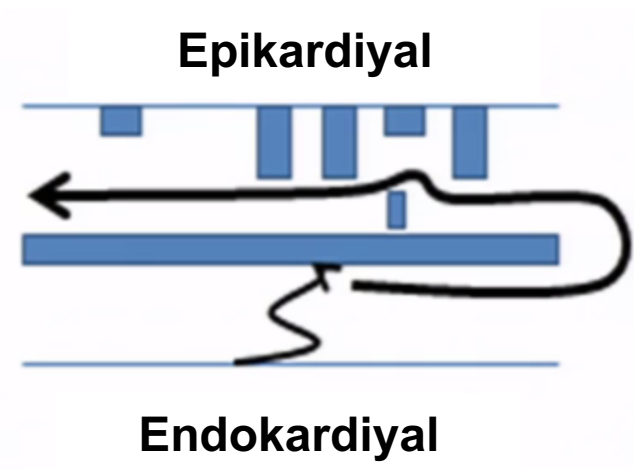


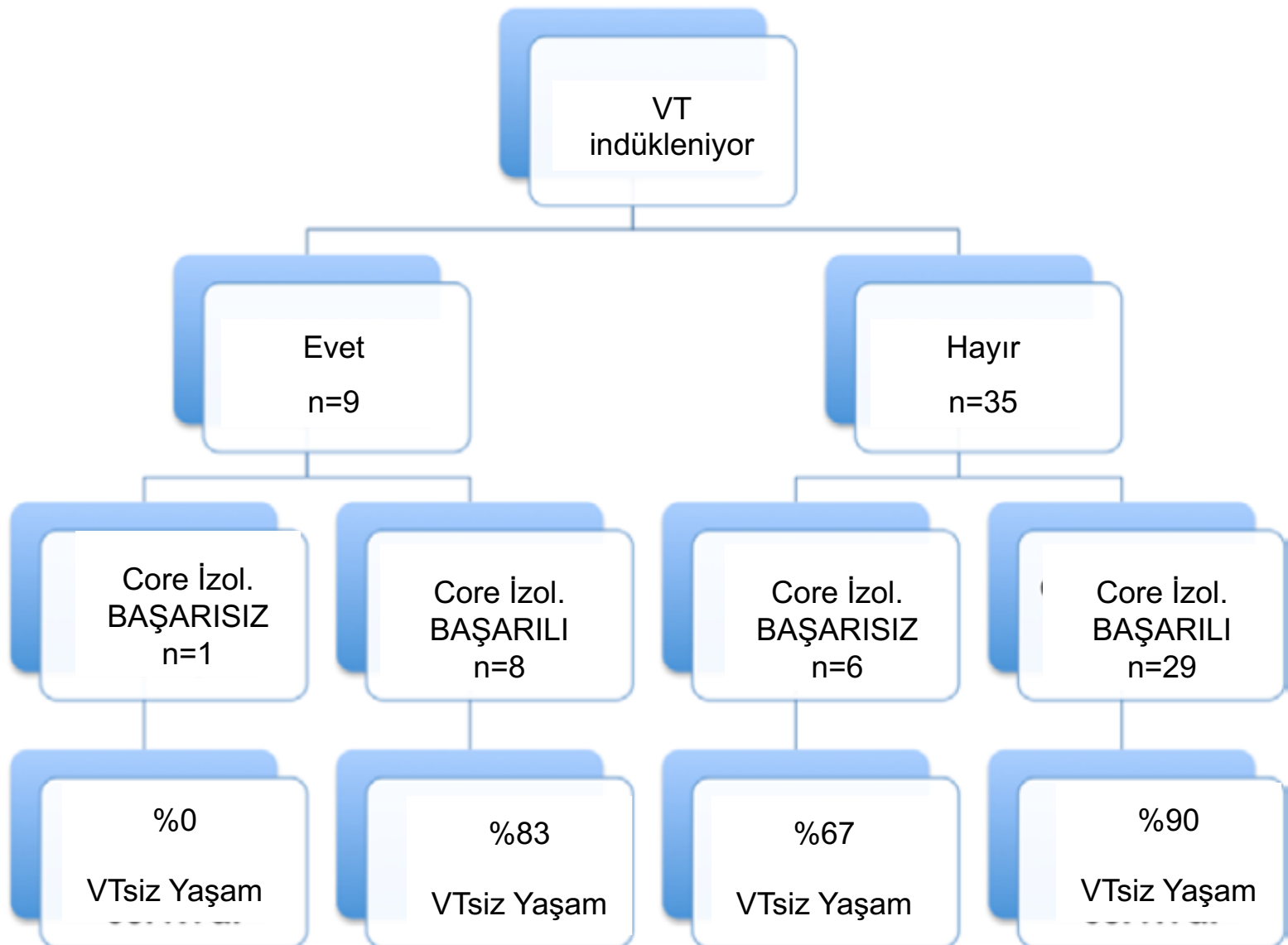
Tzou W, 2013



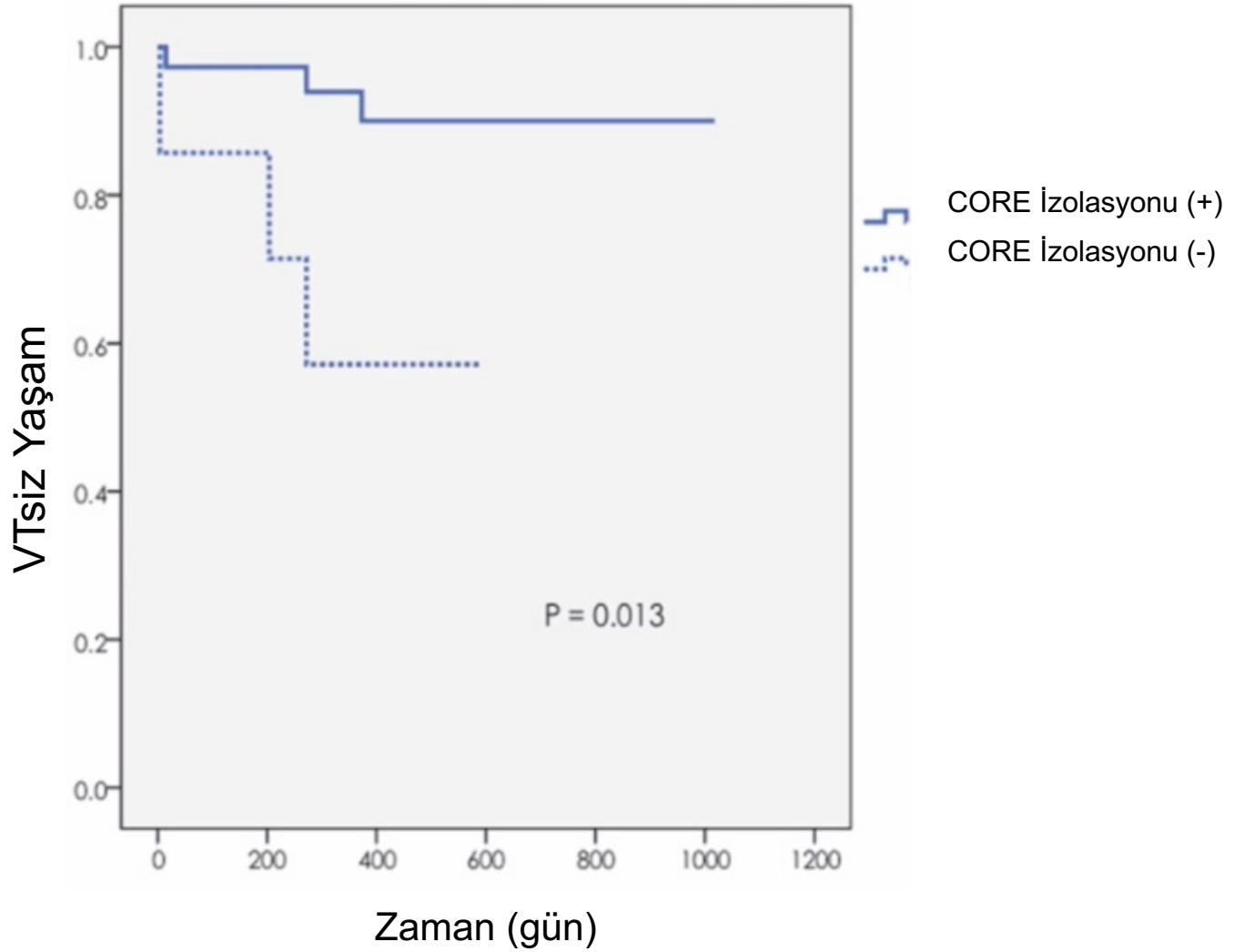
Skar

A small blue square, representing the color and appearance of scar tissue in the heart wall.





Takip

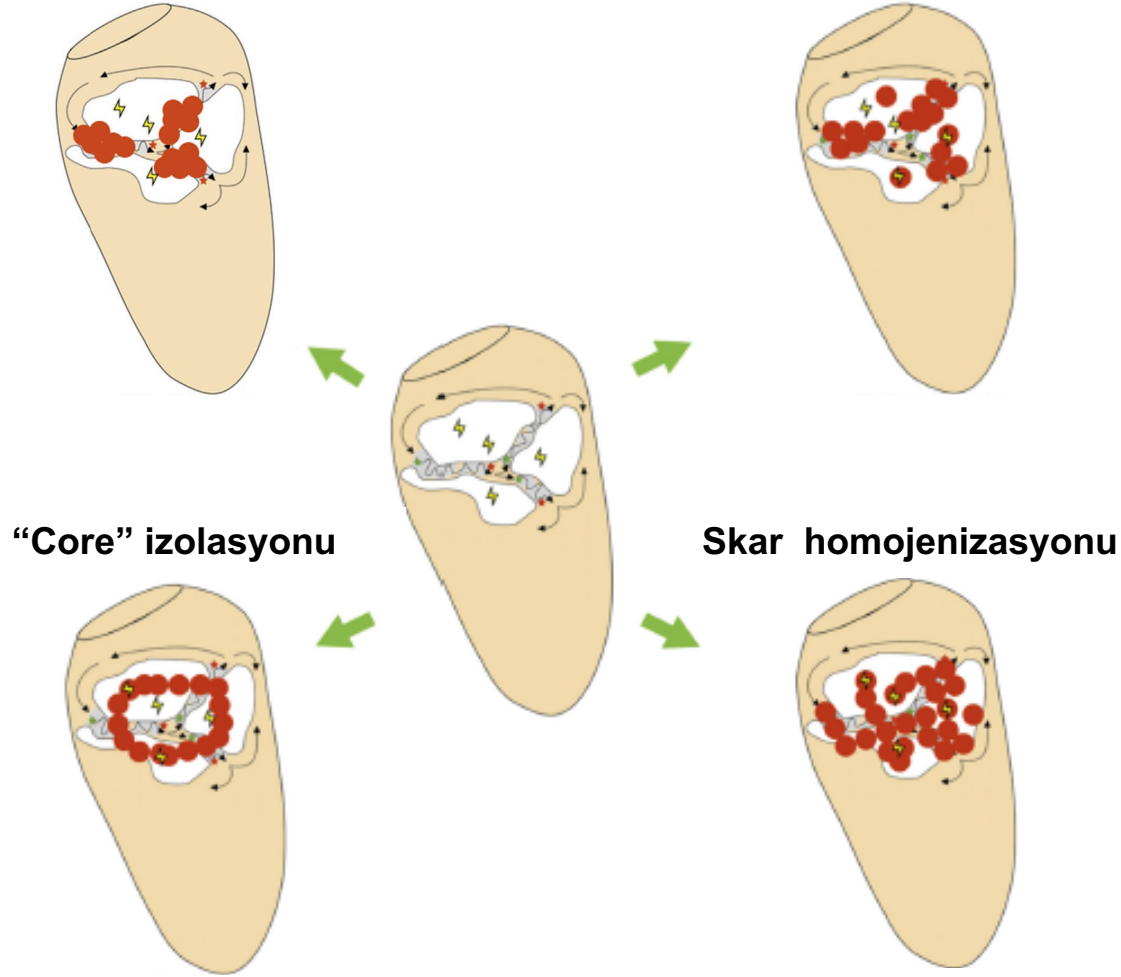


Sınırlılıklar

- Kapak veya mid-miyokardiyal skar gibi anatomik bariyerlerin varlığı gerekli
- “Core” izolasyonu her zaman başaramıyor
(İskemik KMP’de hedef bölgeye 2 dk, noniskemik KMP’de 5 dk RF)
- Yapılan izolasyonun kalıcılığı /Rekonneksiyon??
- Rekürrens ile gelen hastalarda ne yapalım?

Skar “dechanneling”

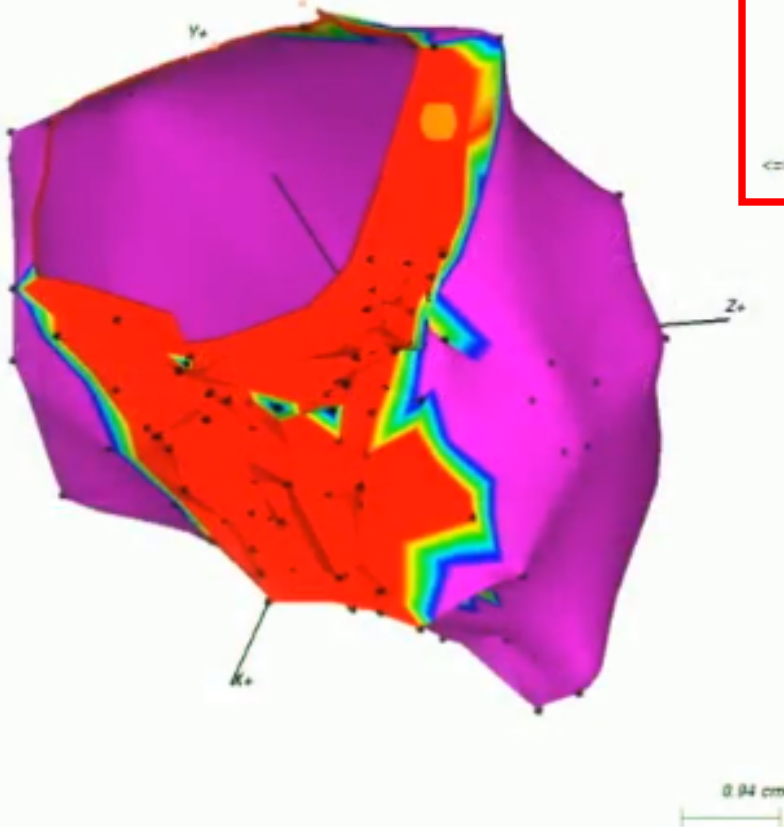
Geç Potansiyel ve LAVA Ablasyonu



İleti Kanallarının tespiti için Voltaj Eşik Ayarı

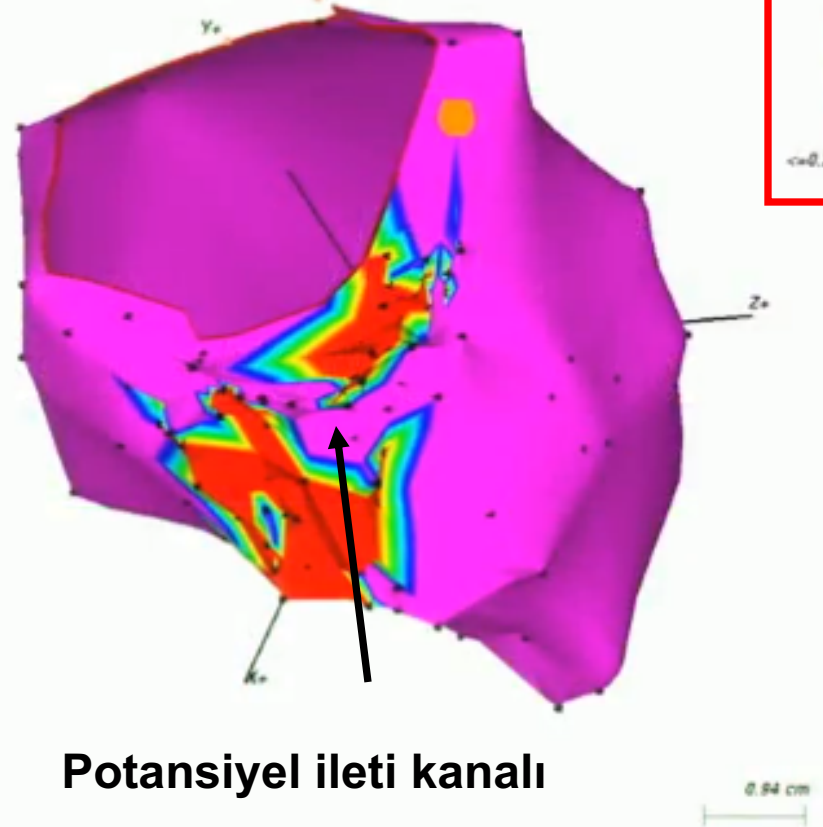
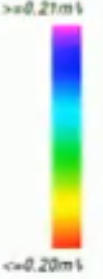
Stage: Baseline
Display: Map 1

Bipolar Voltage



Stage: Baseline
Display: Map 1

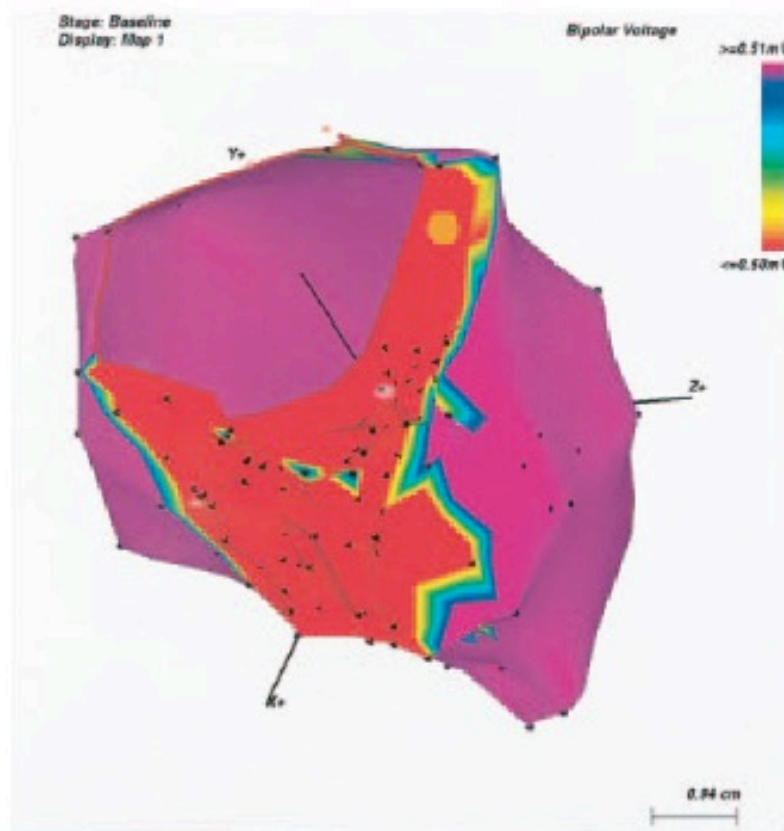
Bipolar Voltage



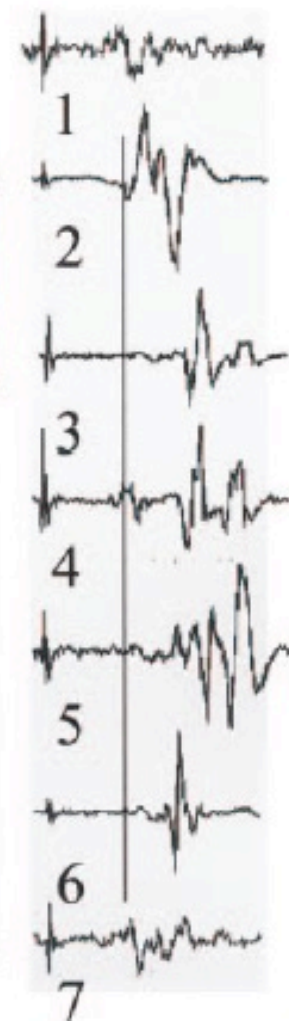
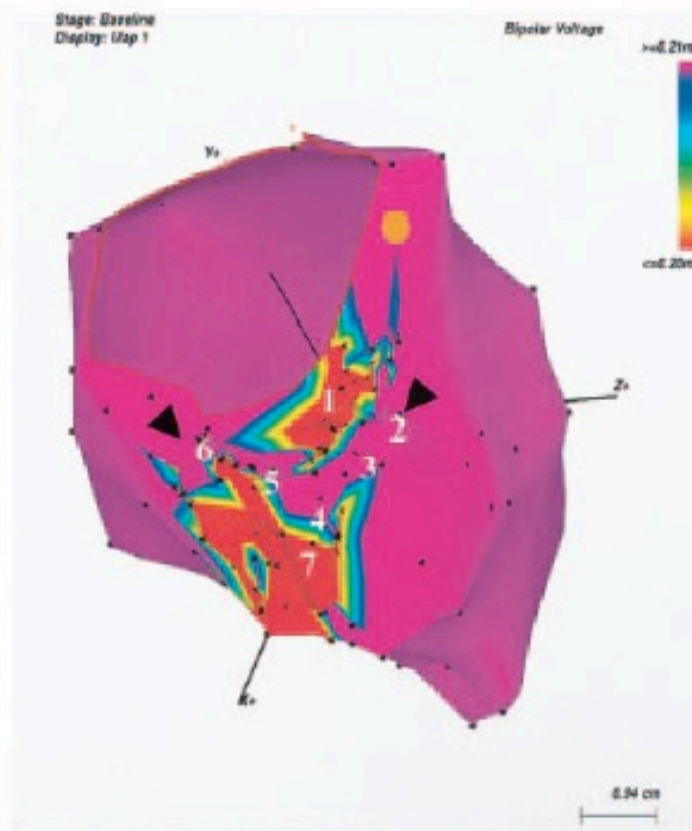
Potansiyel ileti kanalı

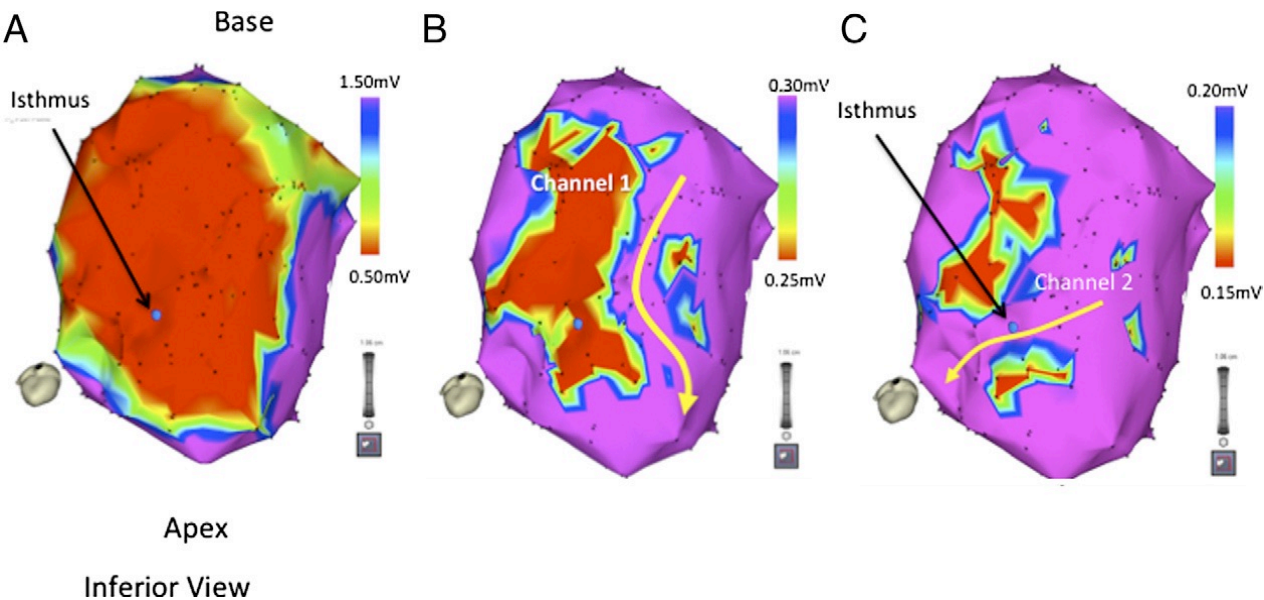
Arenal et al Circ 2004

A



B

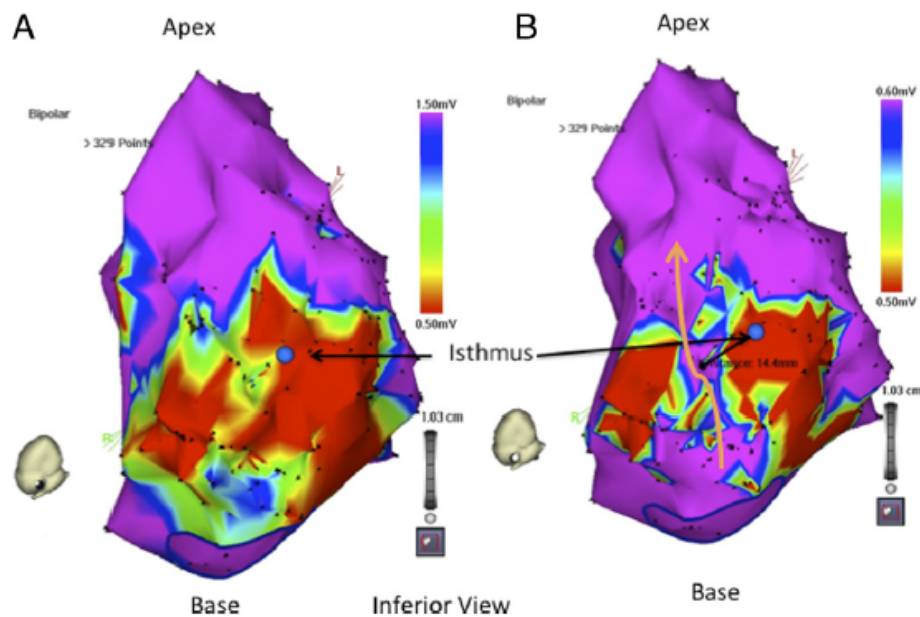




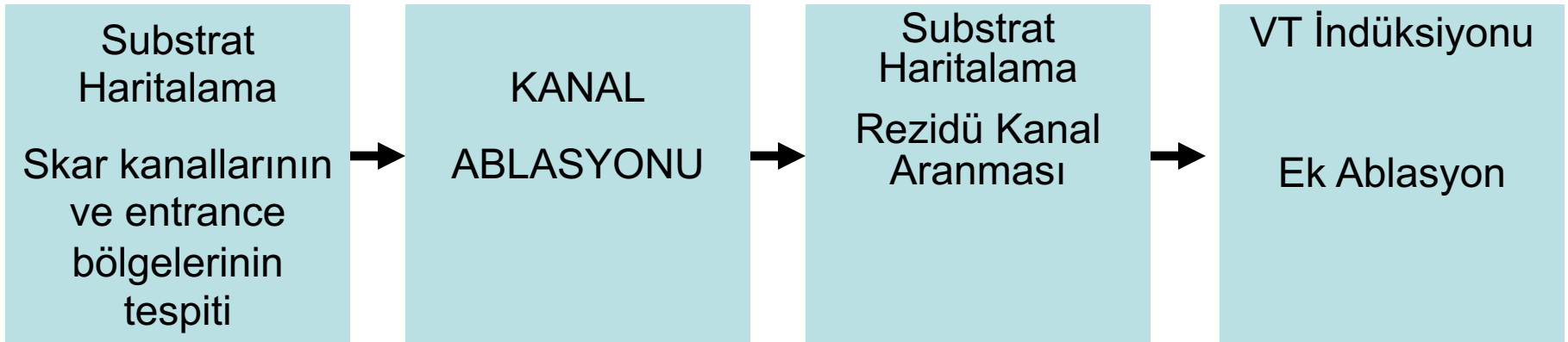
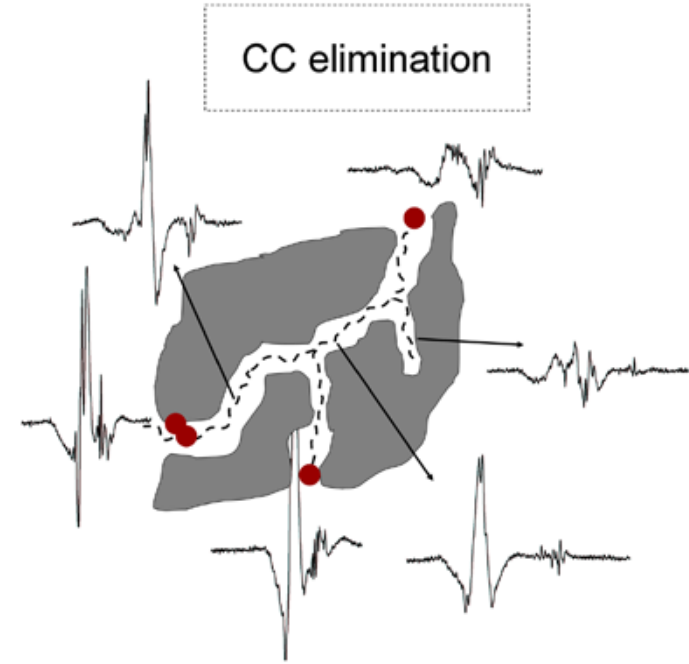
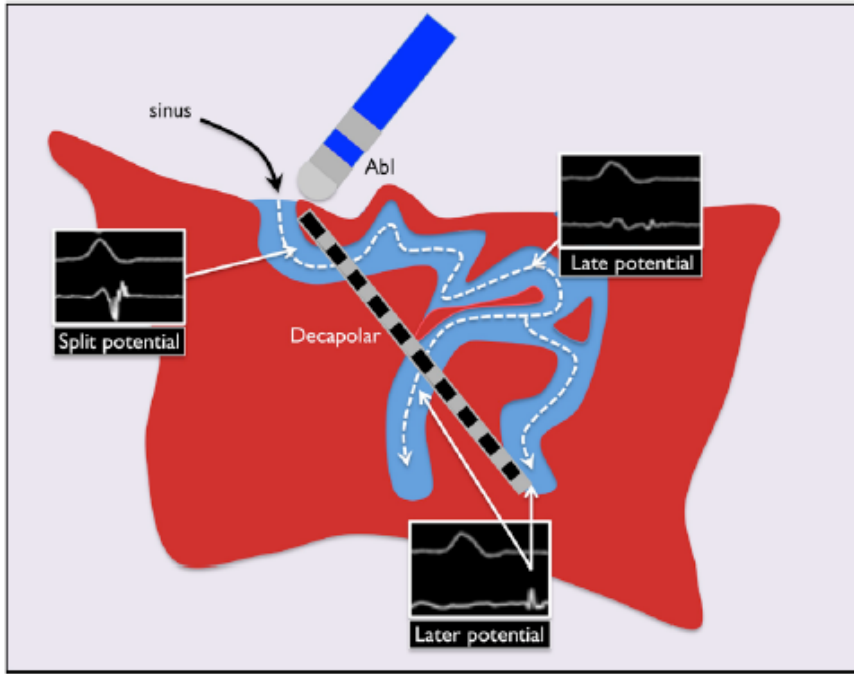
Post-infarkt stabil VTli
24 hastada yüksek
dens. haritalama
(398 ± 152 nokta)

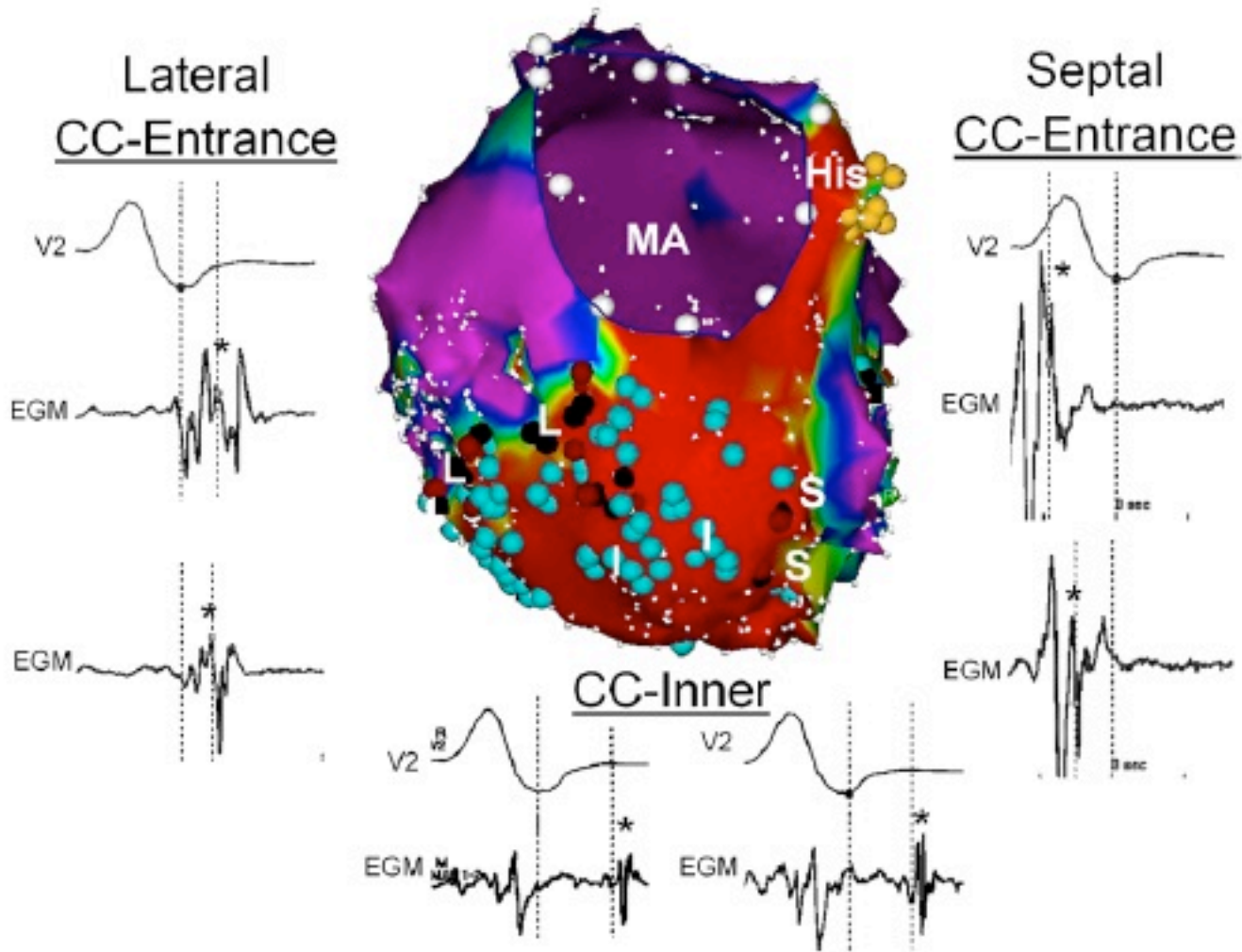
Voltaj skalasında
ayarlama ile:

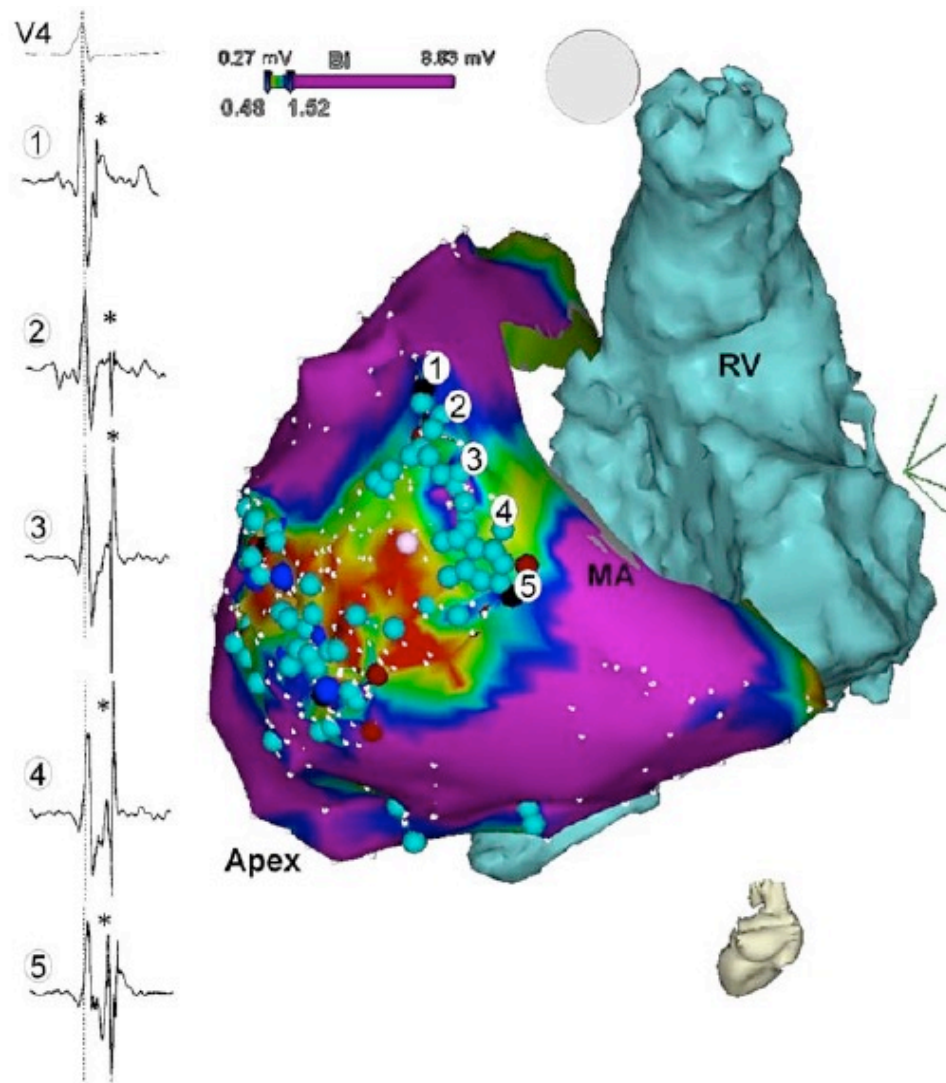
Hastaların %88inde
VT kanalı +

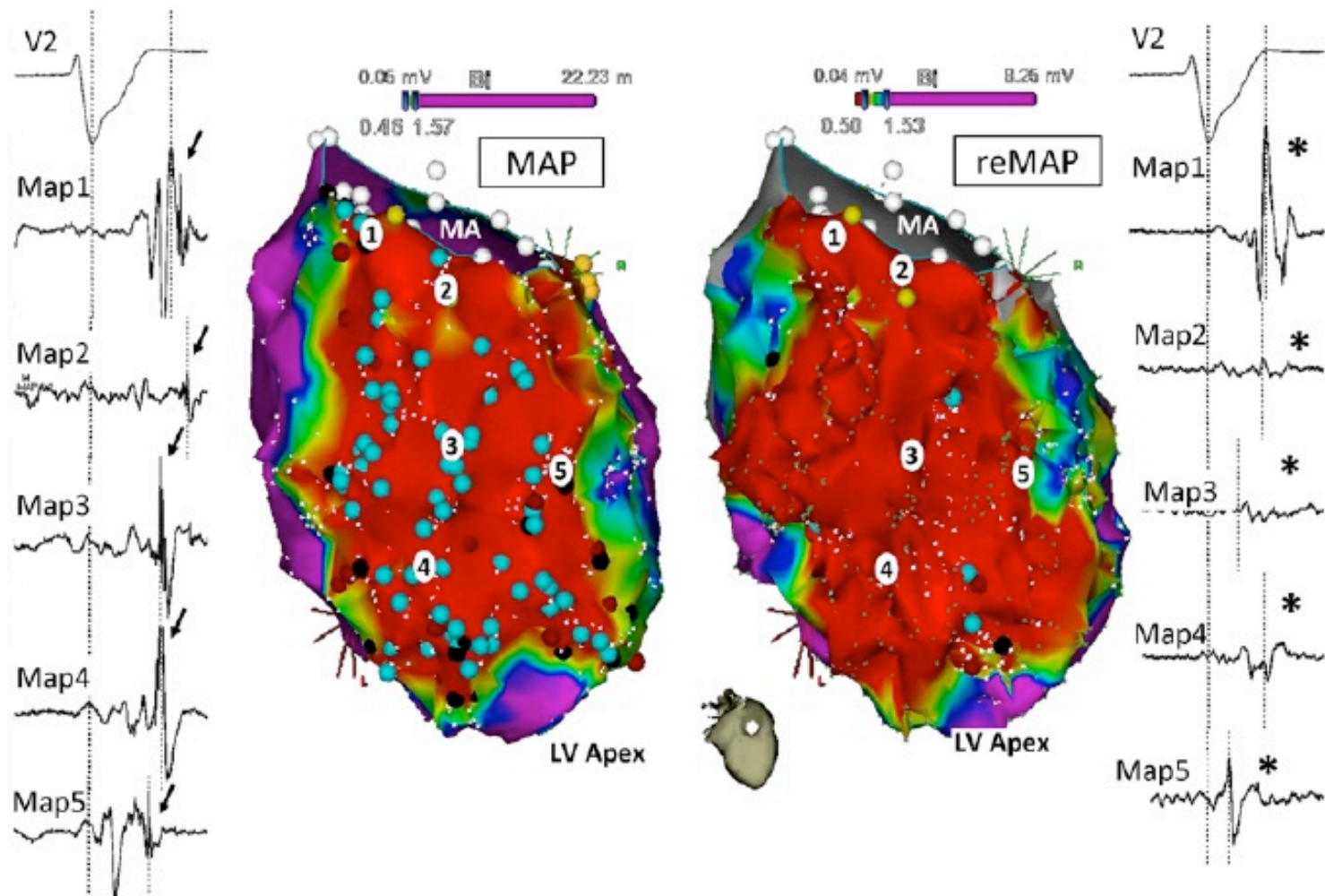


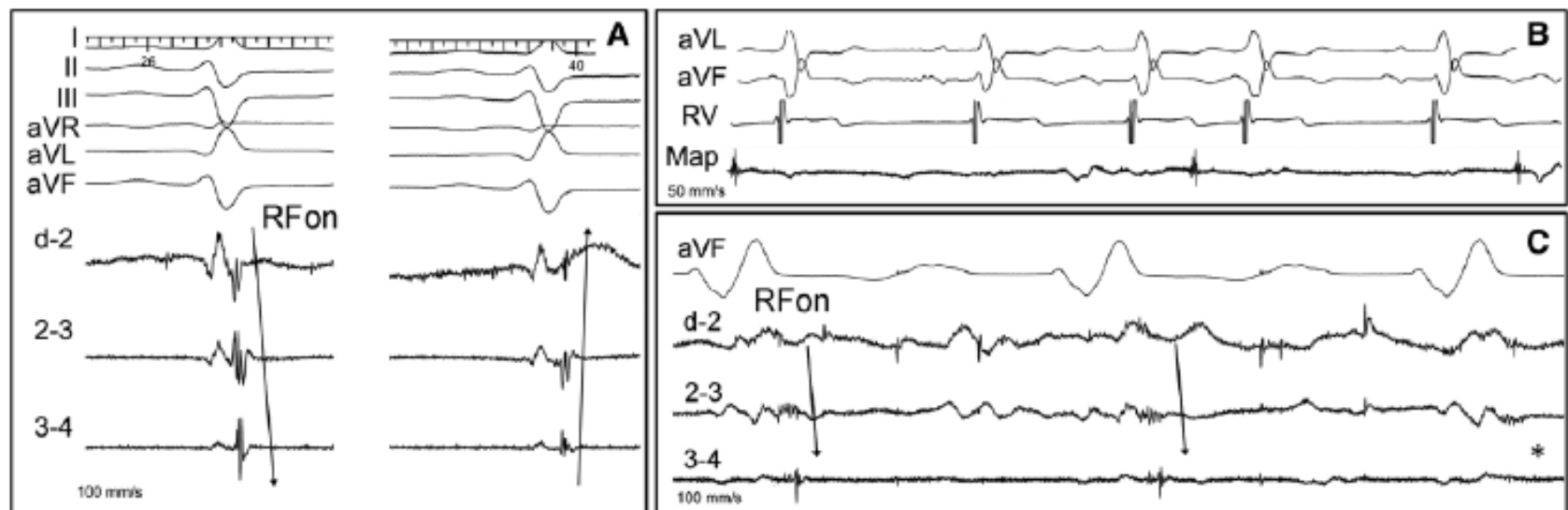
VT istmusunun yerini
belirlemede özgüllüğü
%30!!

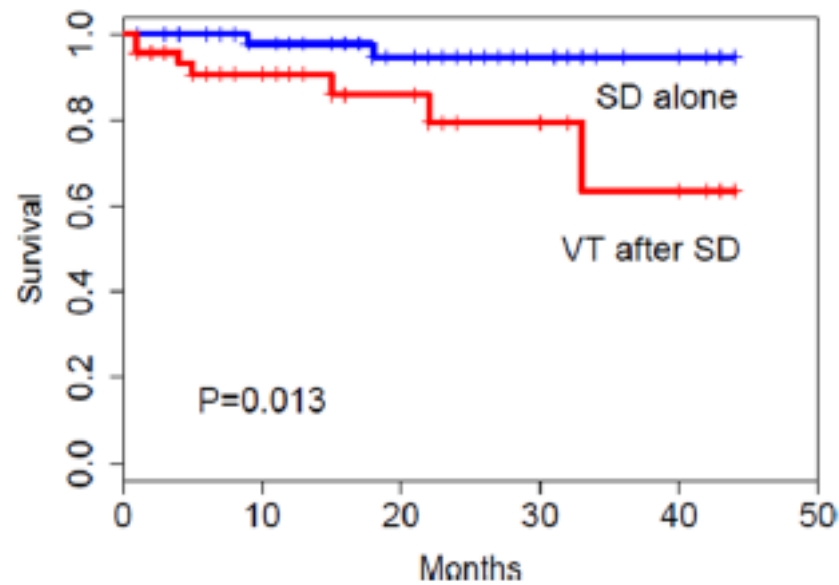
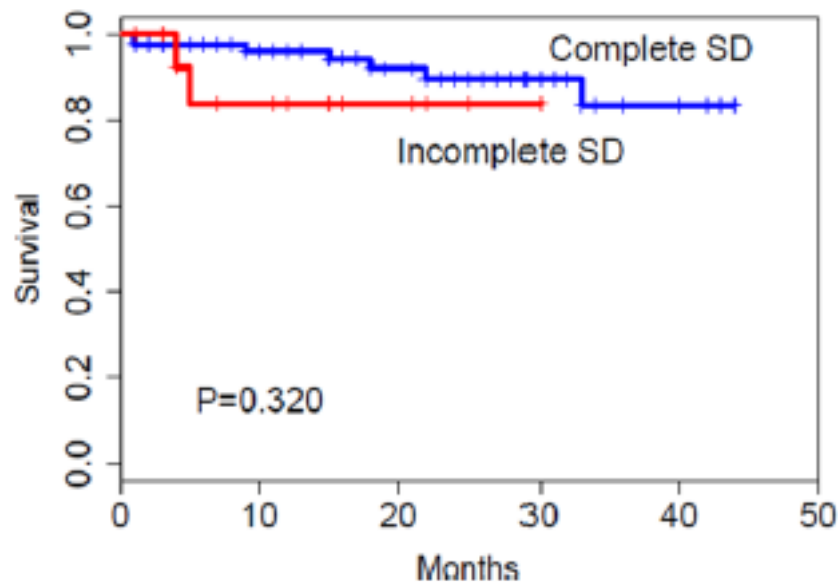
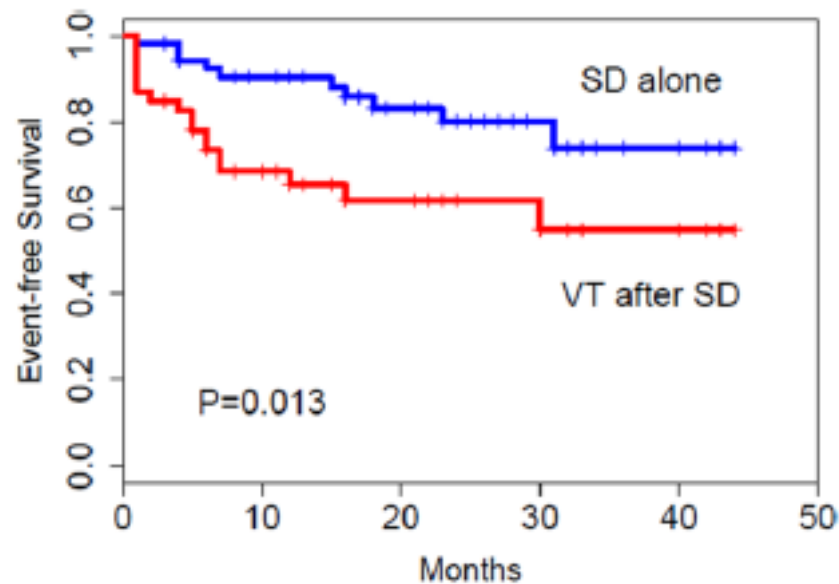
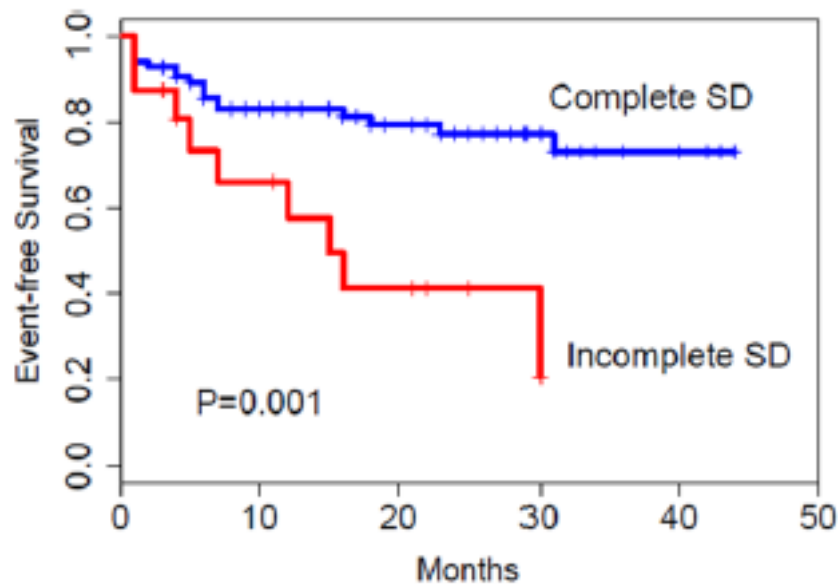










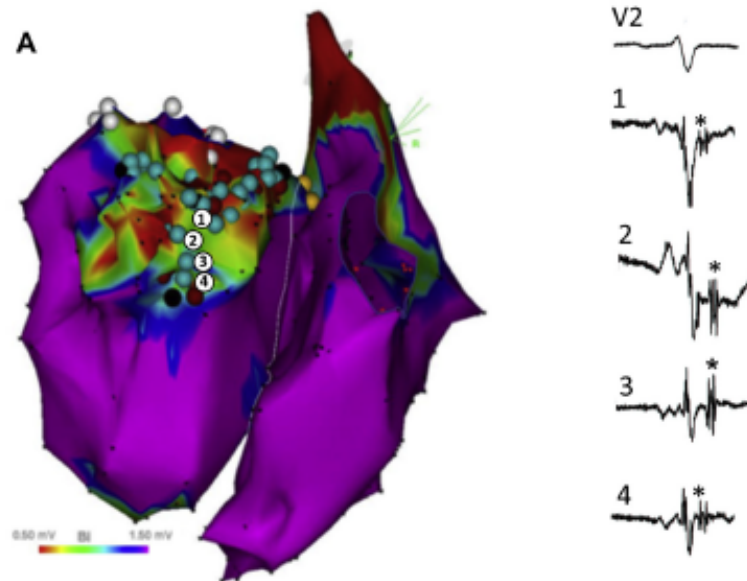


Sınırlılıklar

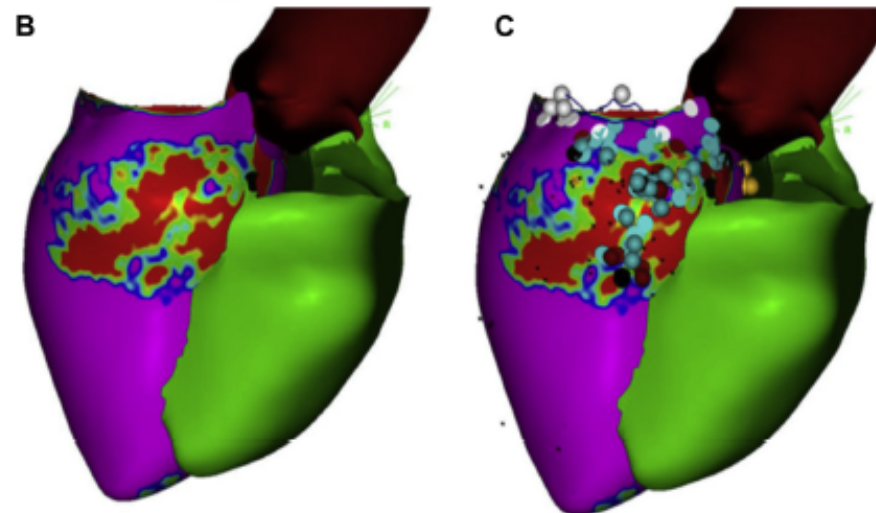
- “Voltaj kanalları”nın lokalizasyonun belirlenmesi hataya açık
- Kateter temasının olduğu bölgede lokal aktivasyonun far-field sinyallerden ayrımı önemli (farklı noktalardan farklı CL ile “pacing” gerekebilir)
- Skar içindeki aktivasyon paterninin ve “entrance” noktalarının kesin olarak belirlenmesi gerekiyor. (Yüksek yoğunluklu haritalama ile bile zor)
- Aktivasyon sekansı, SR veya değişen bölgelerden “pacing” sırasında tamamen değişebiliyor
- Tanımlanan “entrance” alanlarının sınırlı sayıda olması gerekli
- Intramiyokardiyal yerleşim, papiller adale /koroner/epikardiyal yağ komşuluğu haritalamayı ve ablasyonu güçleştirir

Cardiac magnetic resonance-aided scar dechanneling: Influence on acute and long-term outcomes @ ▶

EAM

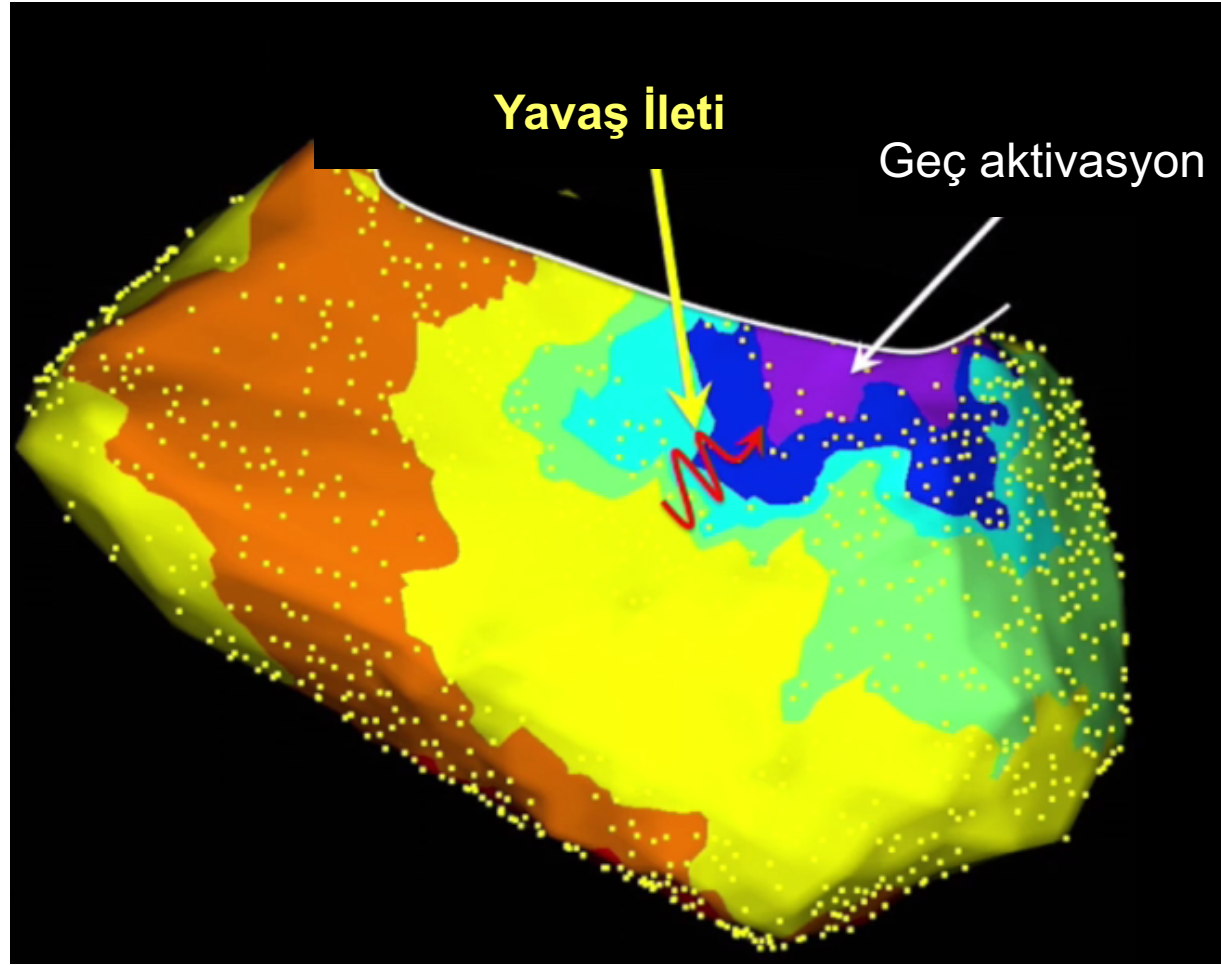
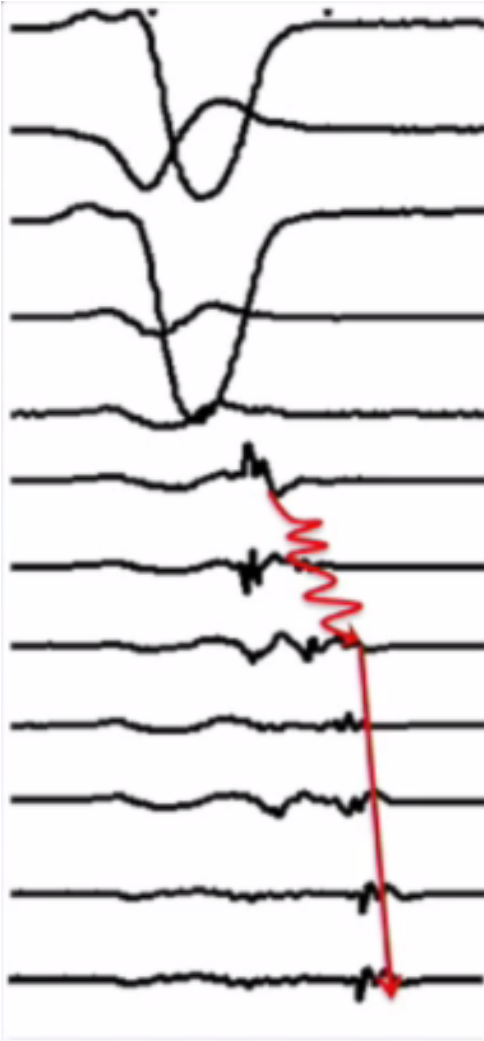


MRG
(PSI Map)

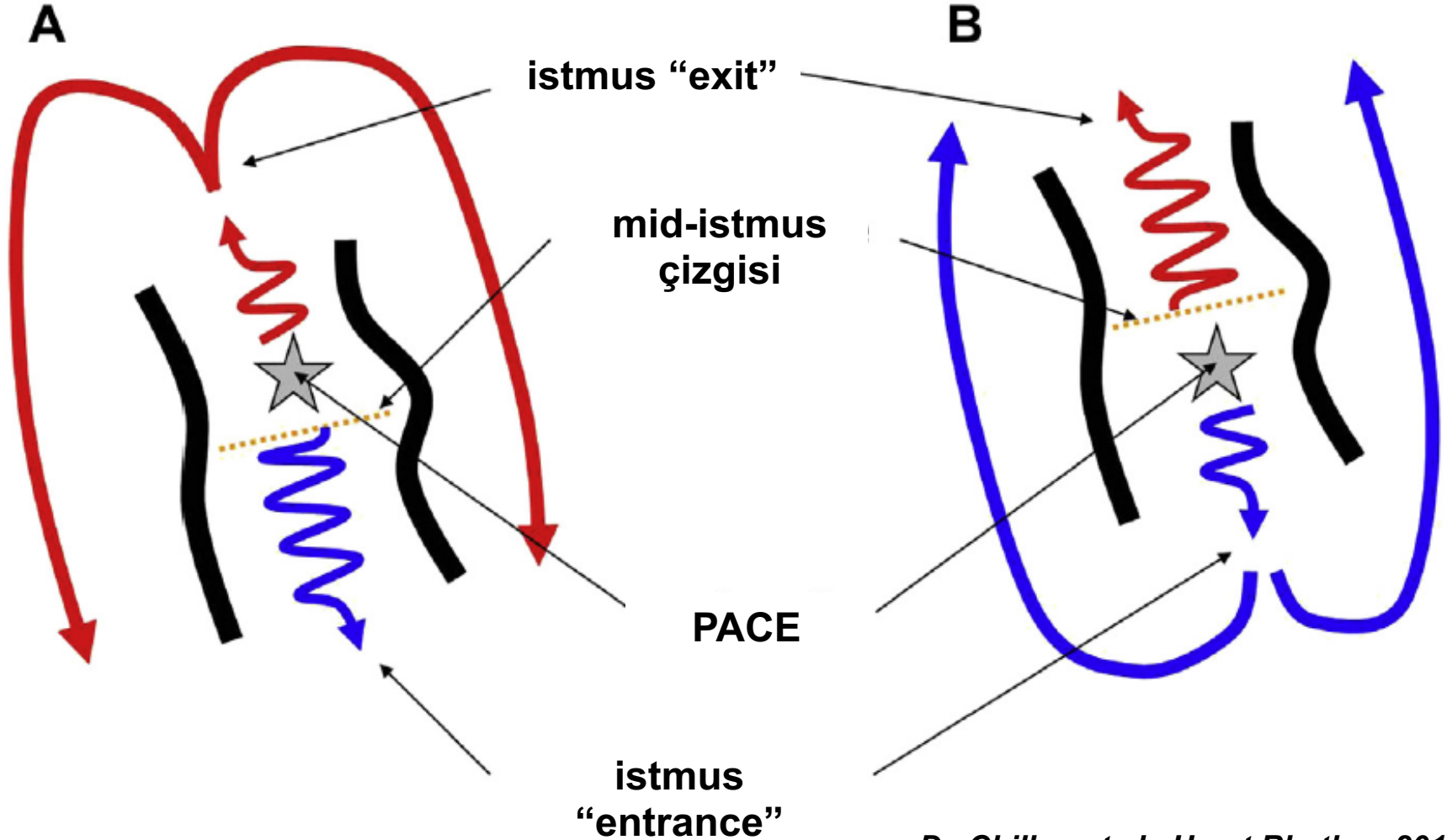


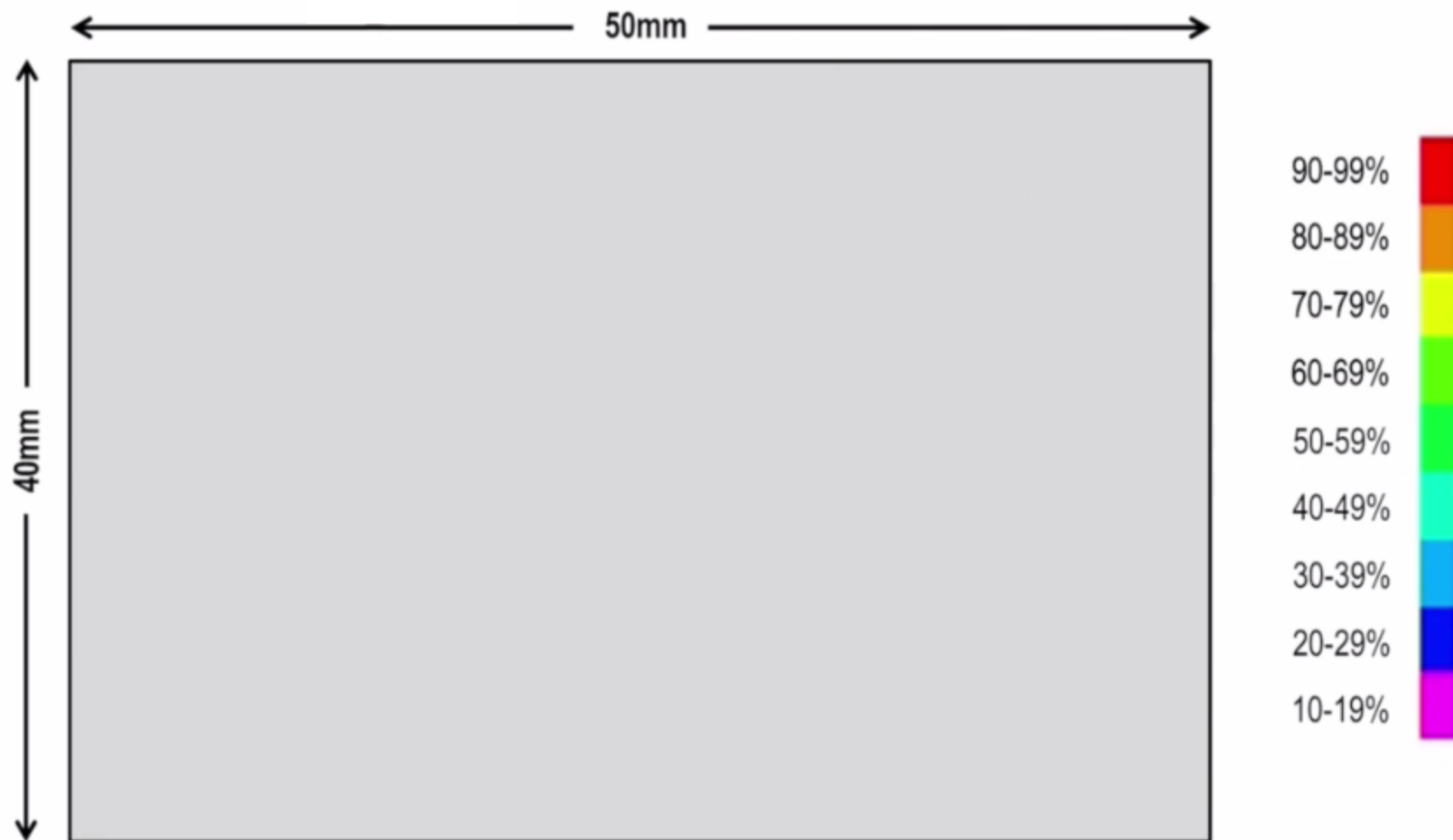
HÍBRID

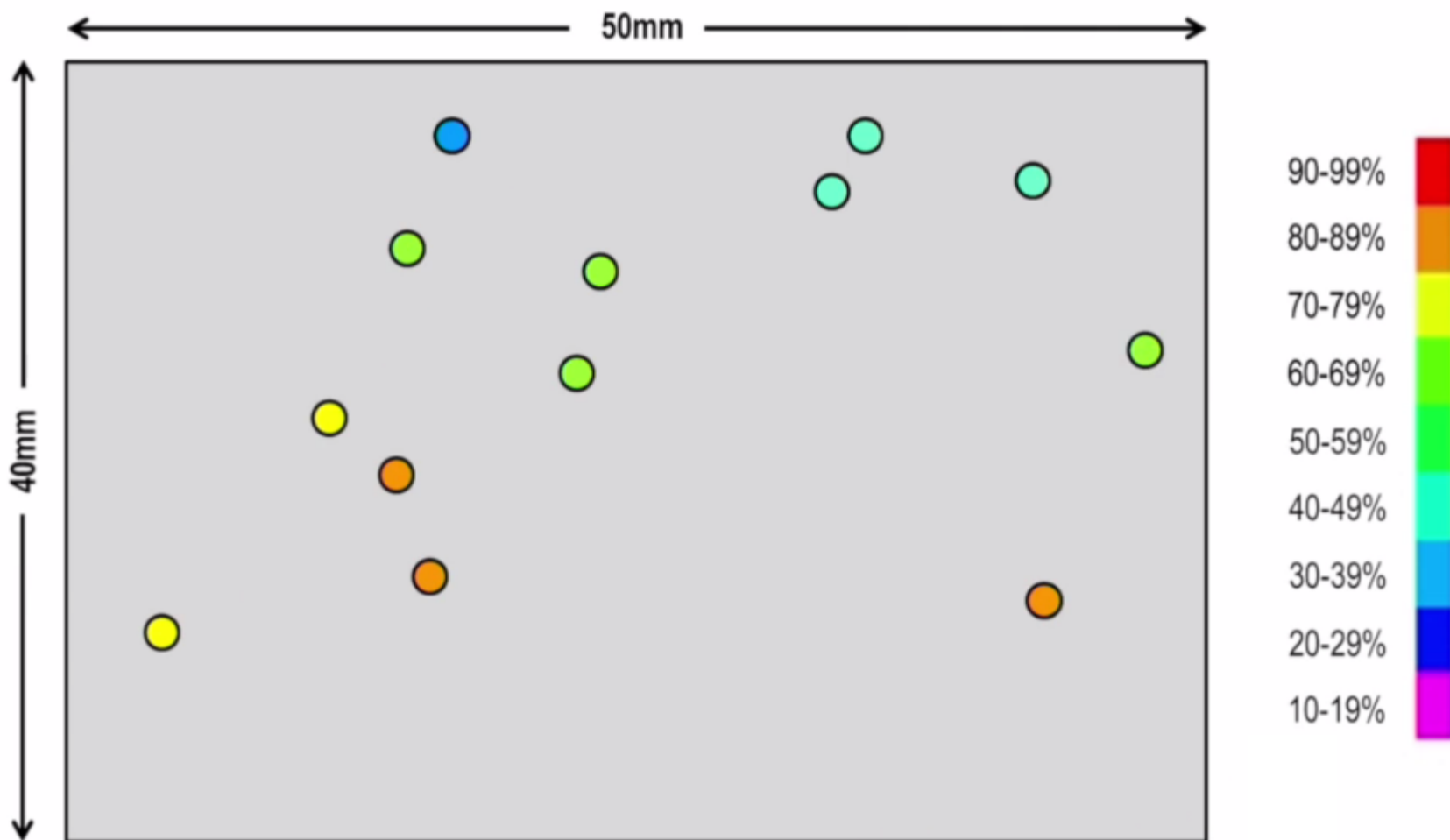
İzokronal Geç Aktivasyon Haritalama

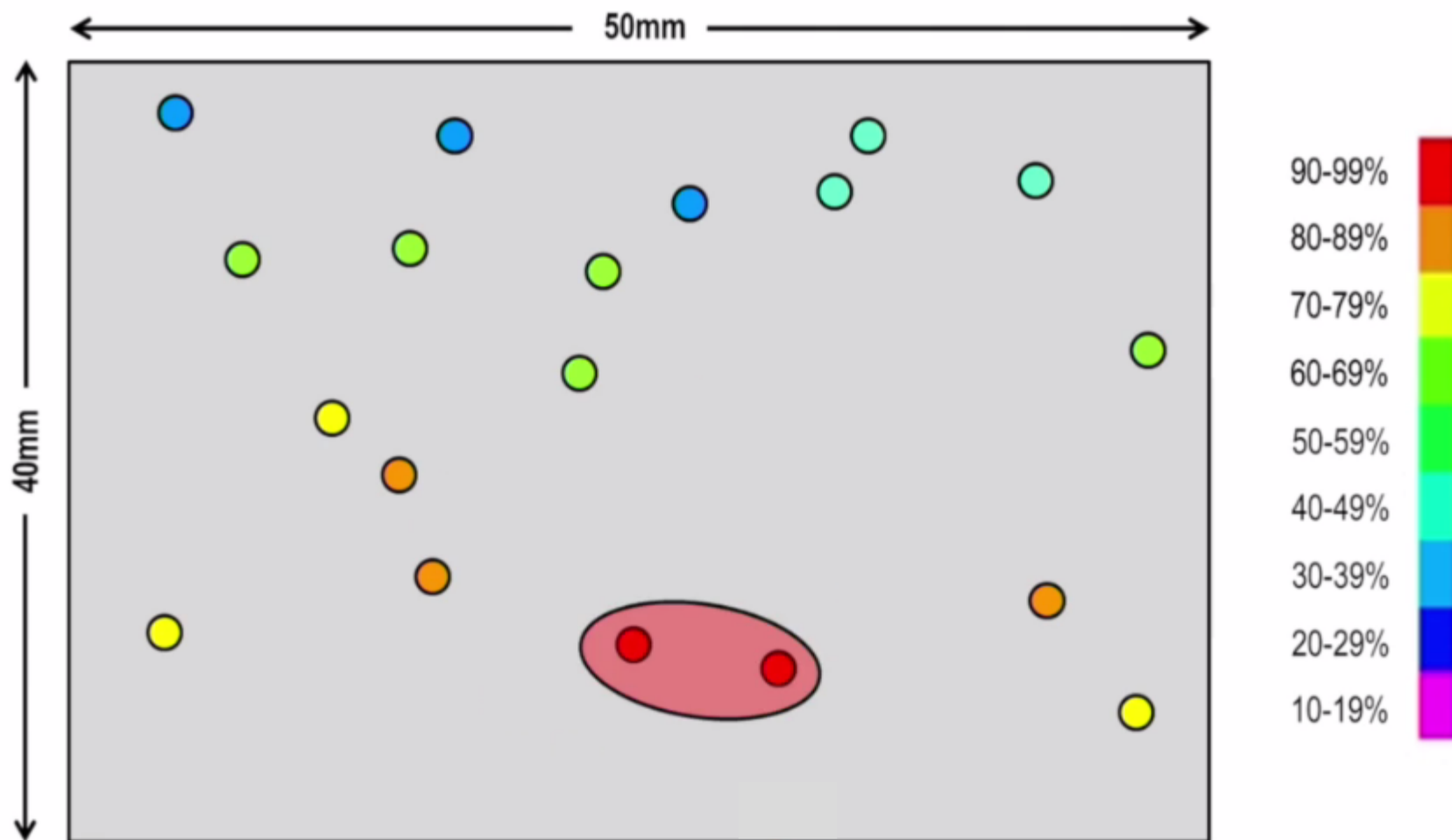


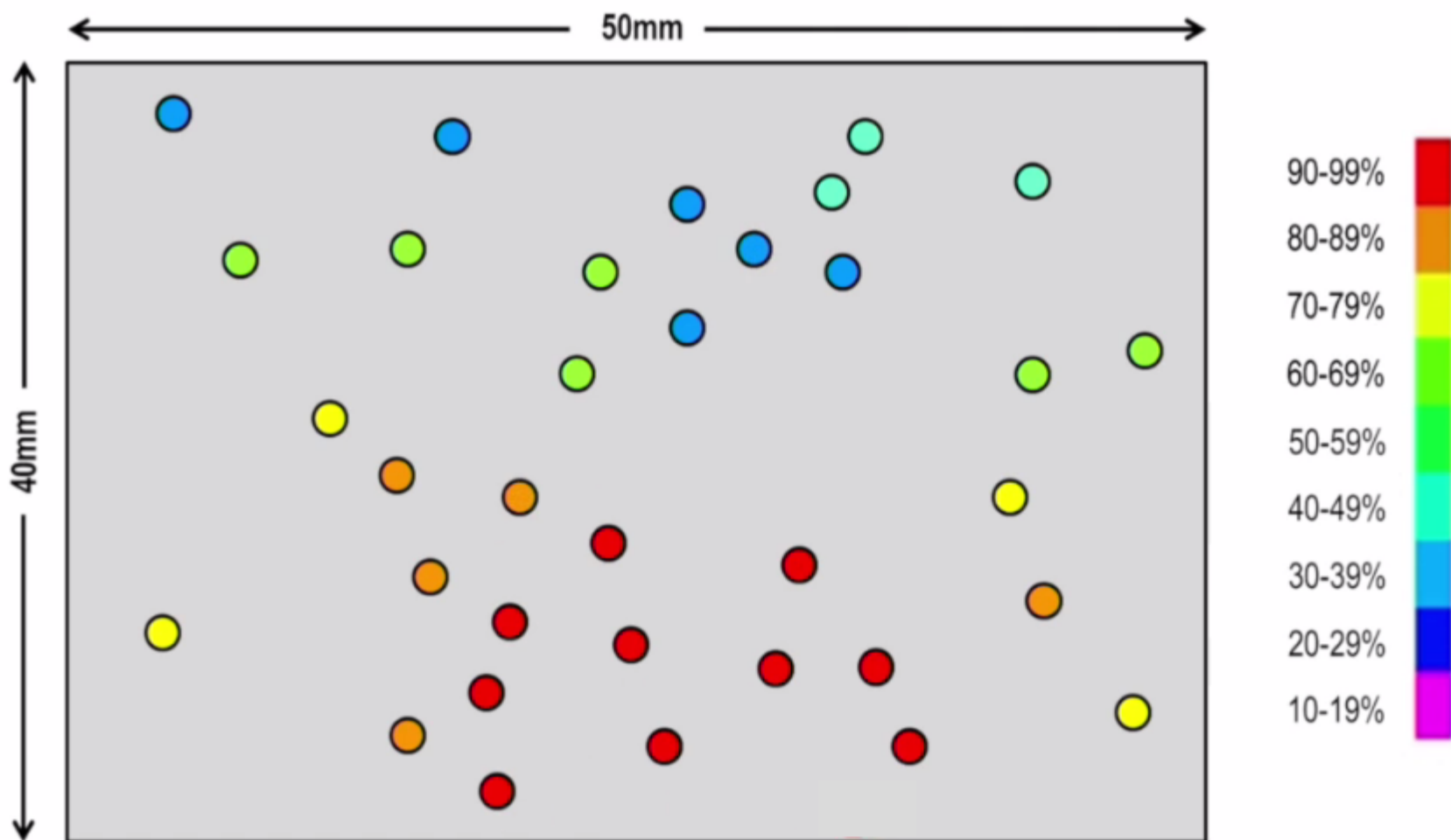
Kritik İstmus'un "Pace Map" ile Tespiti

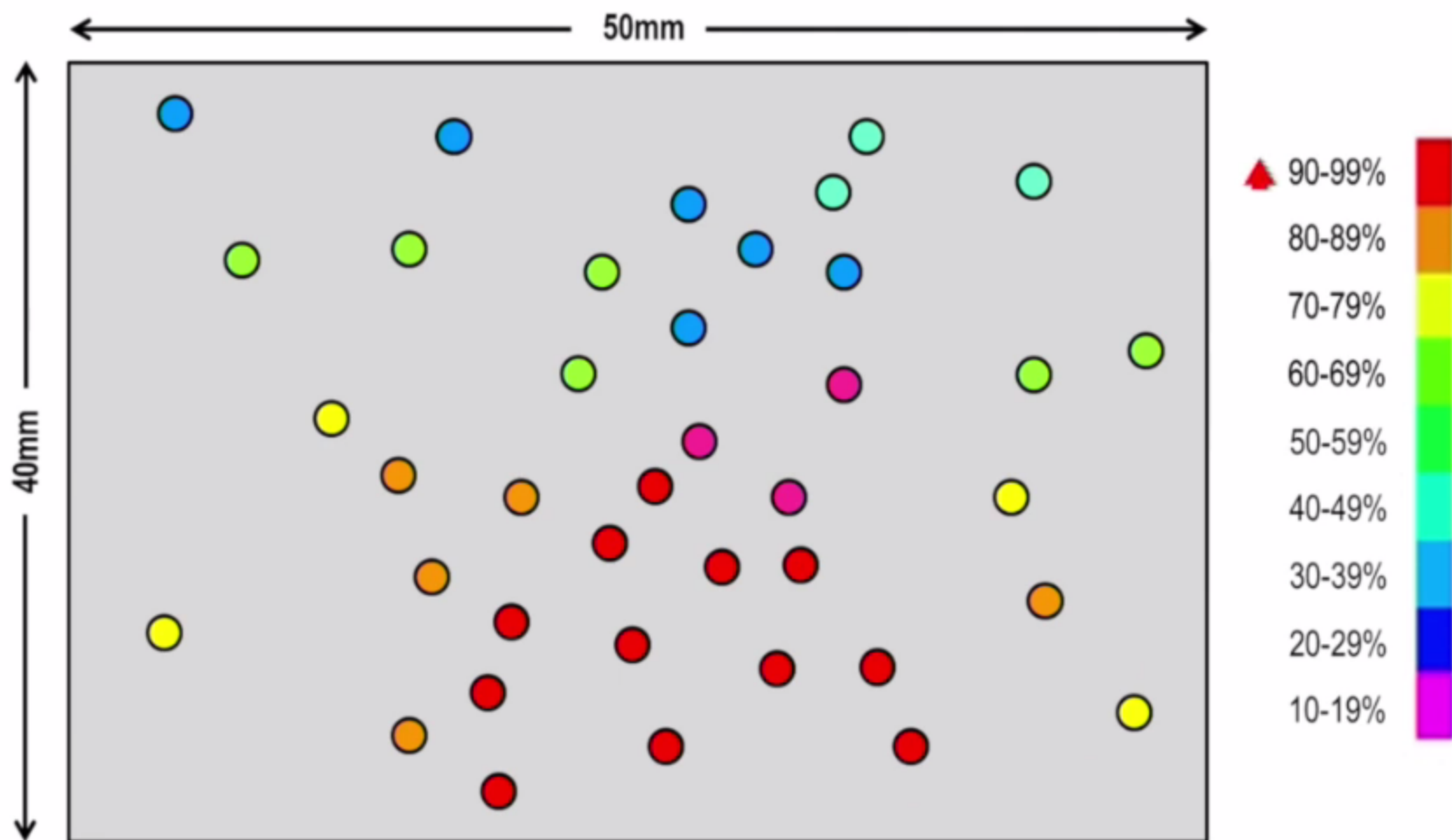


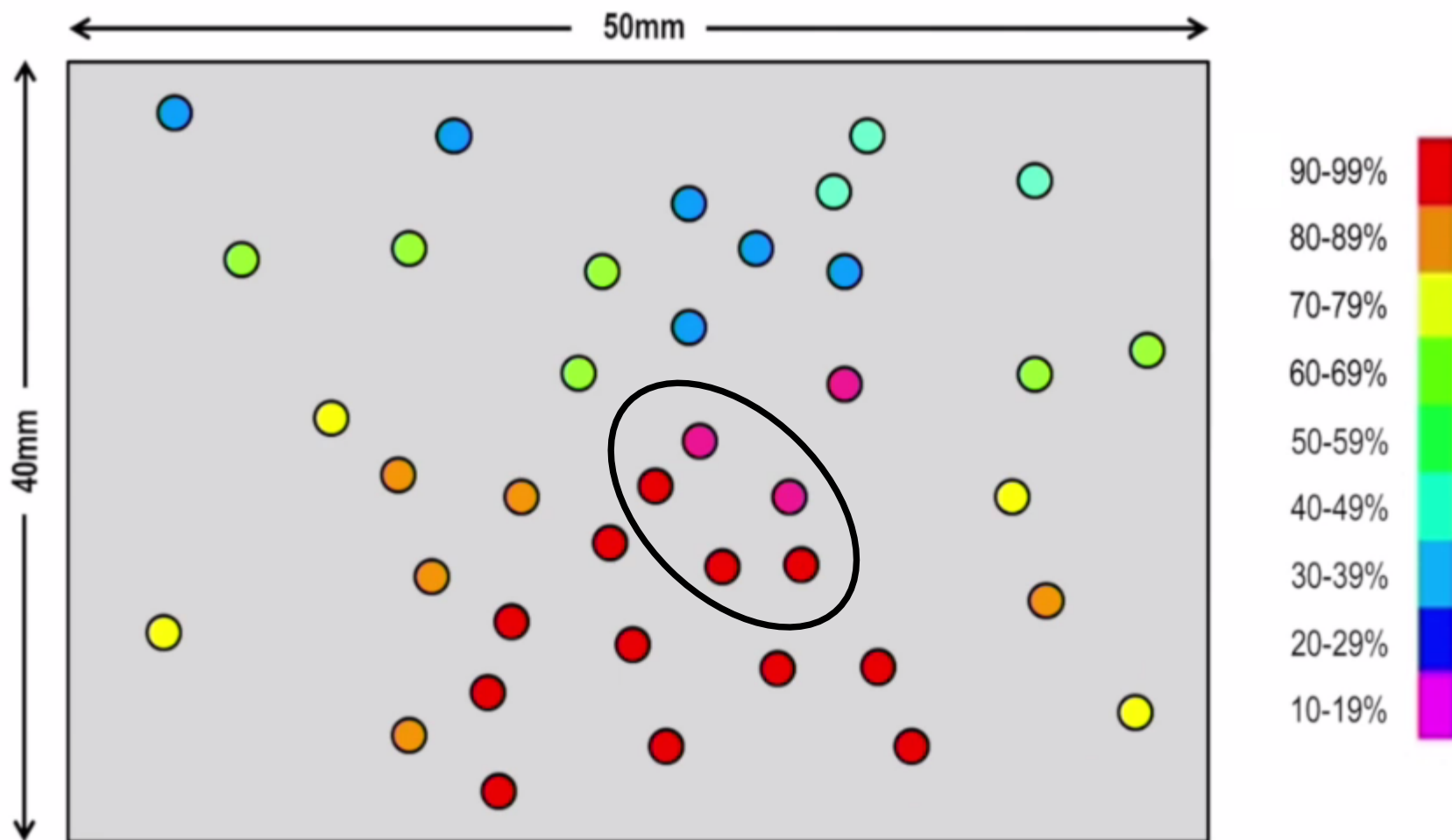


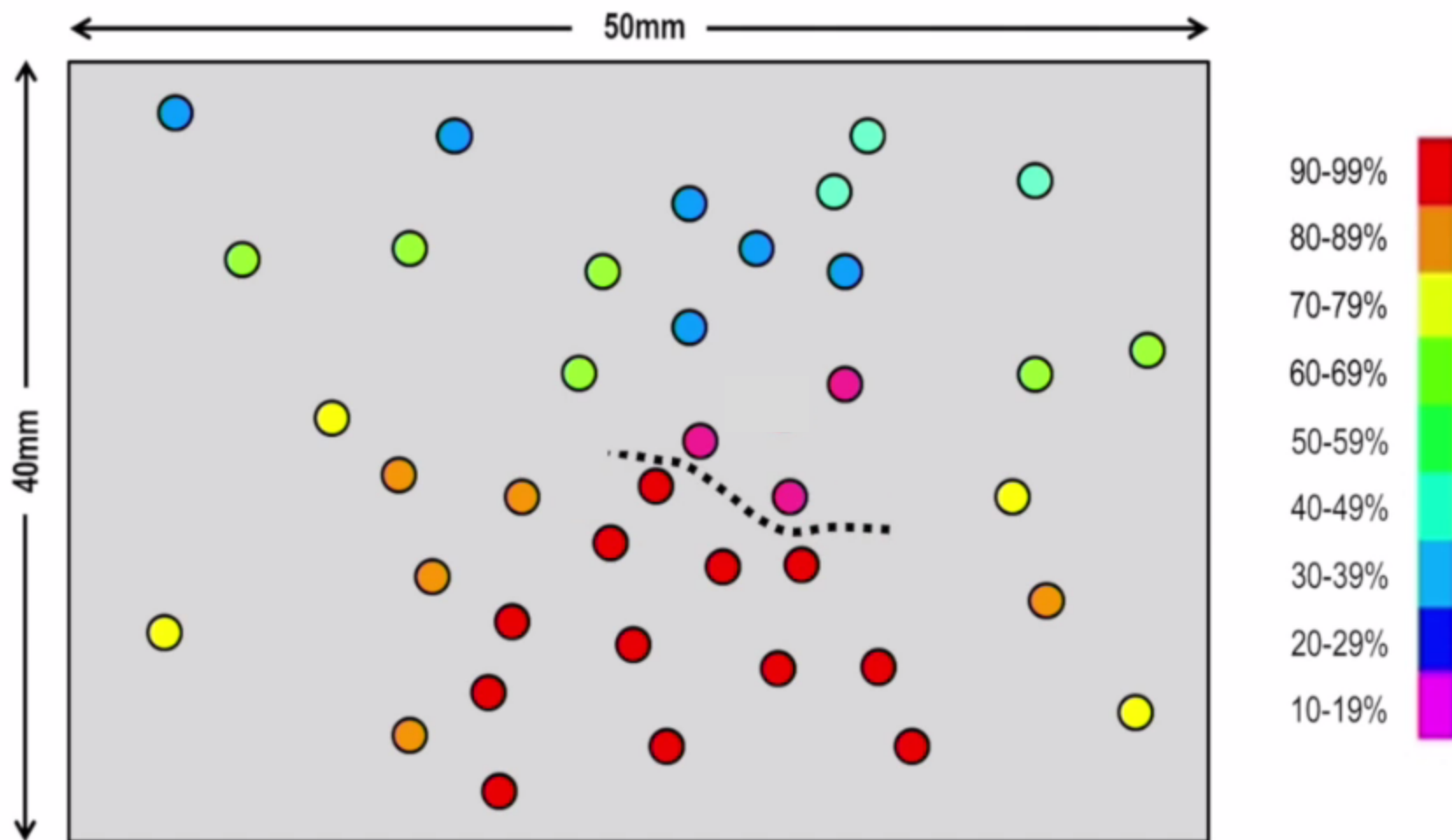


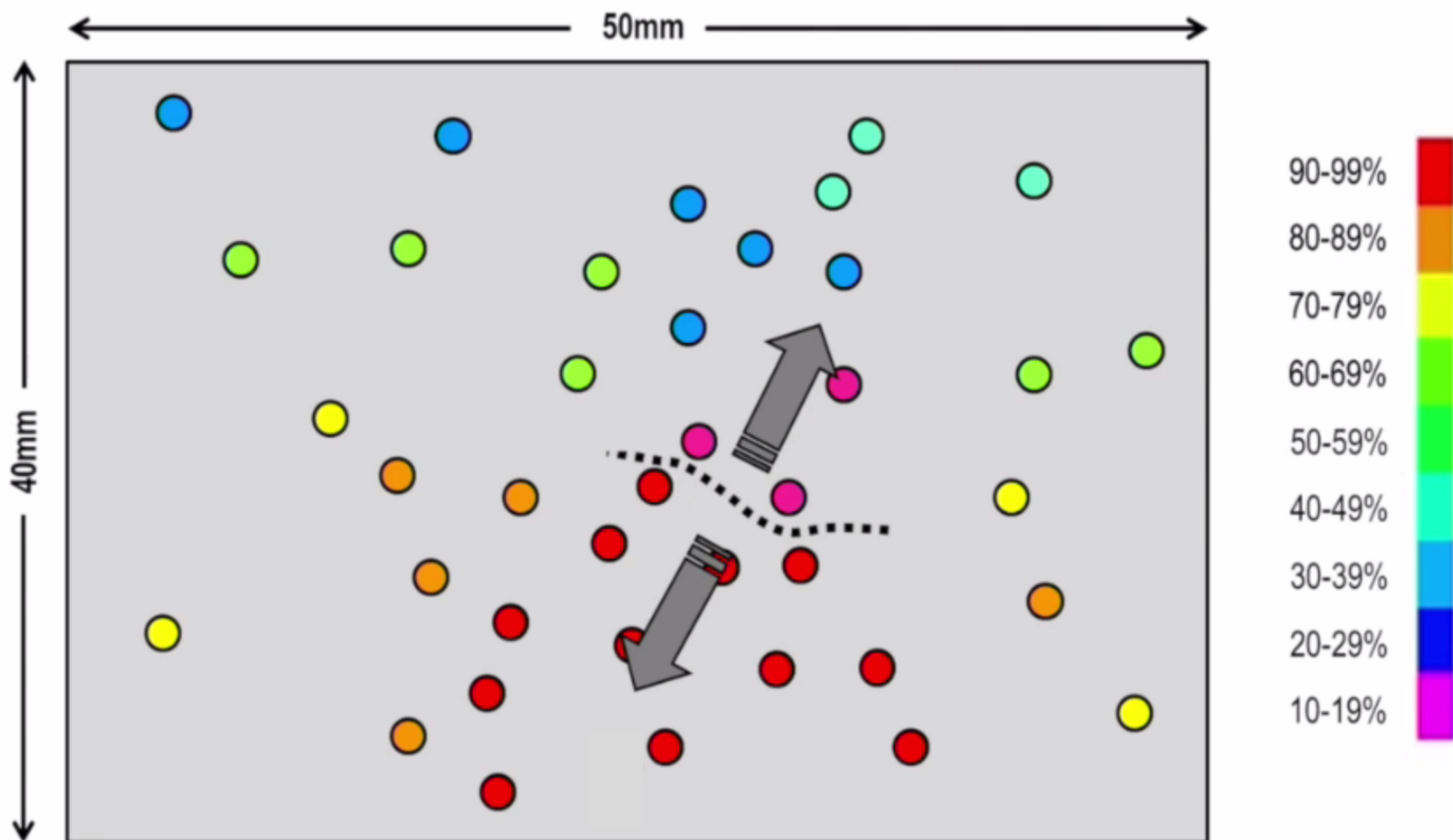


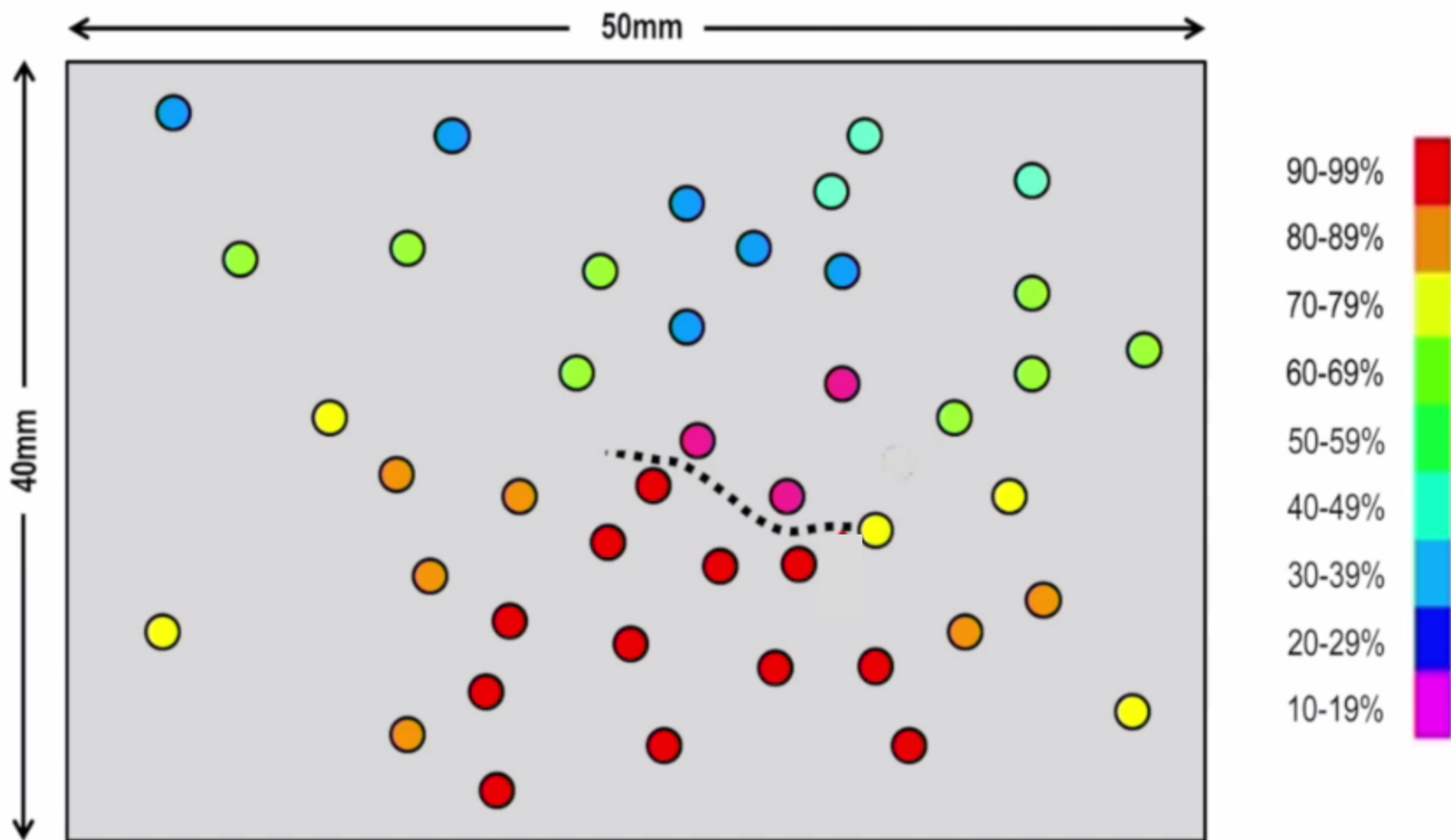


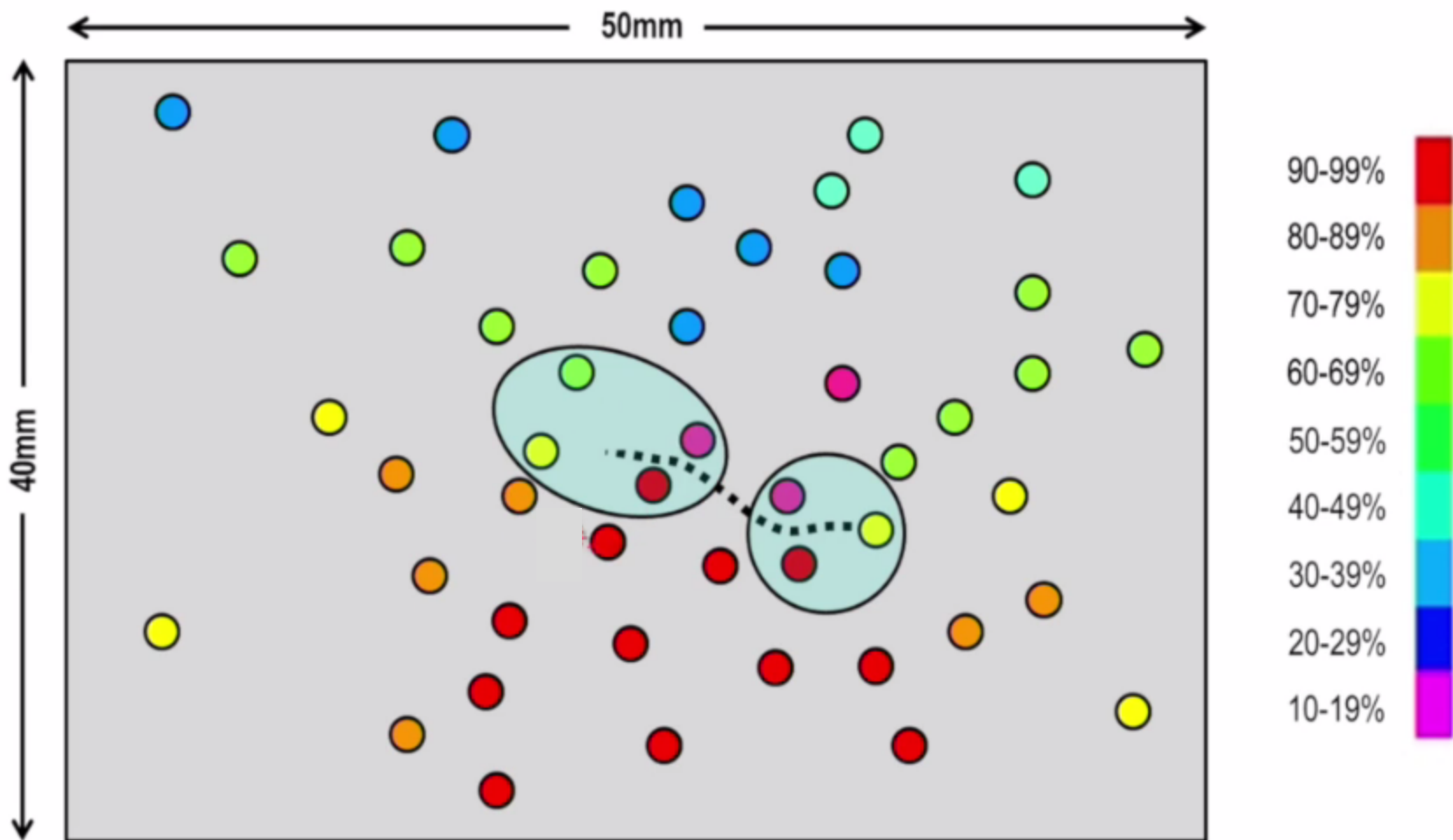


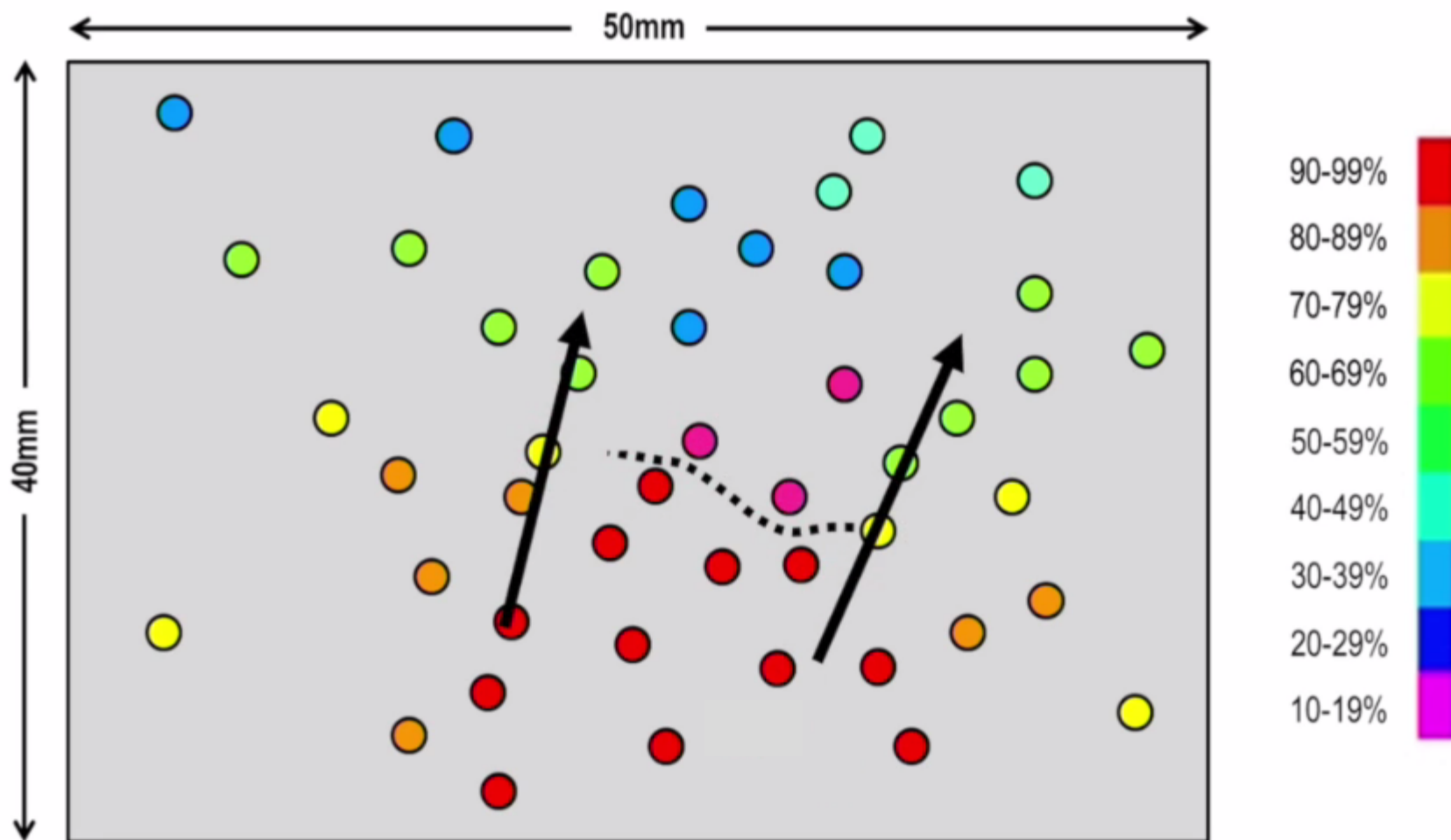


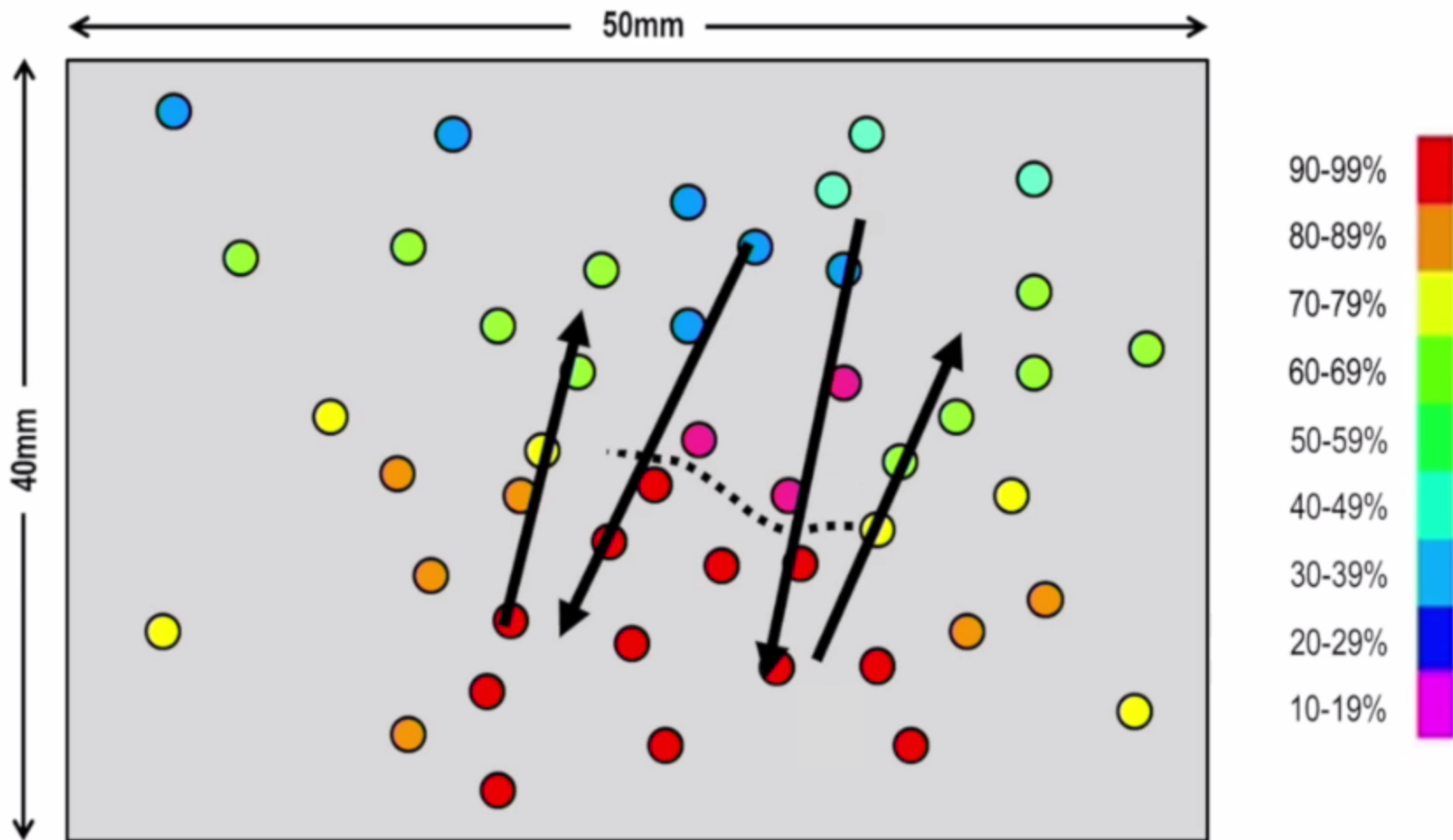


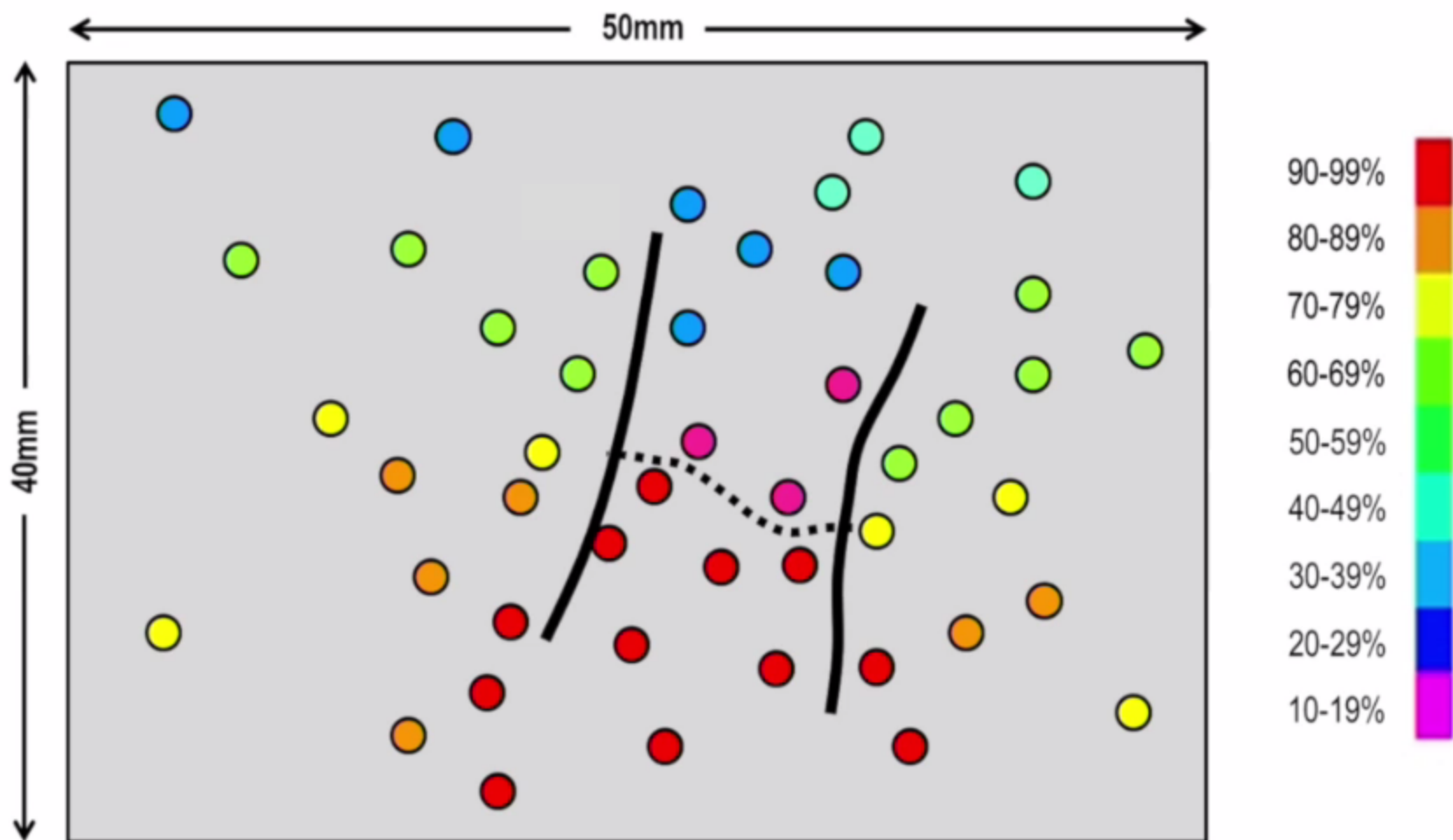


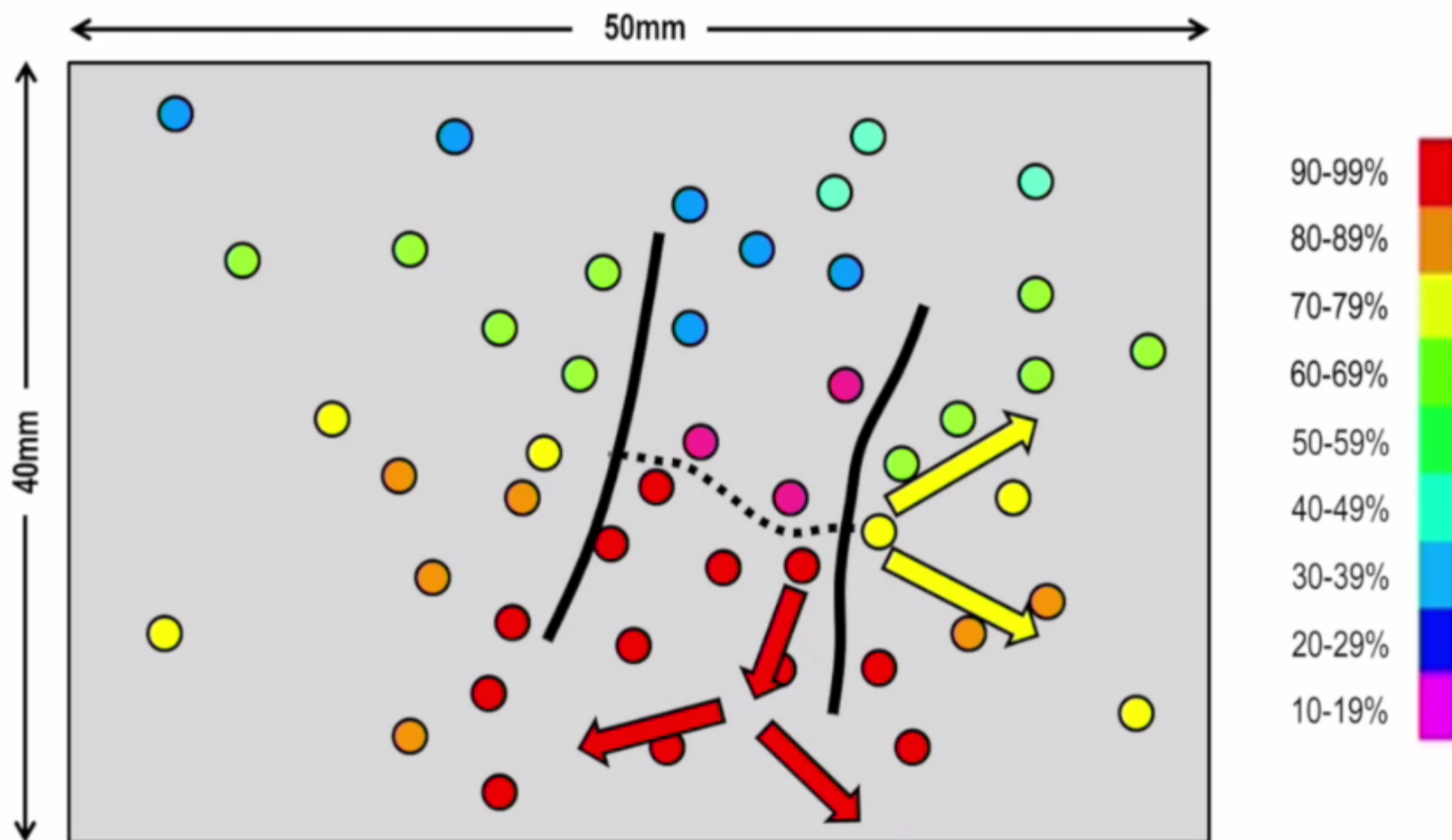


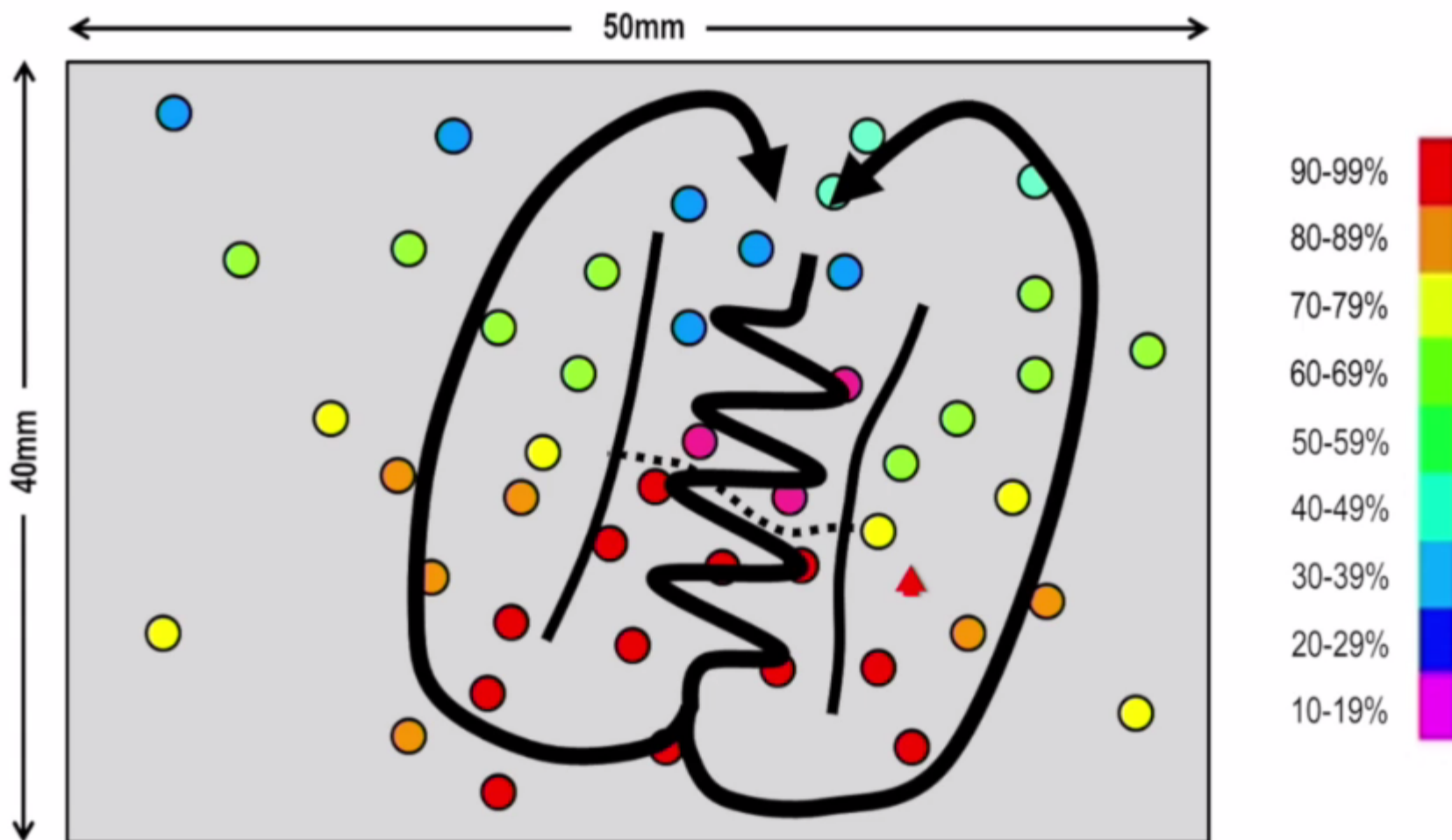




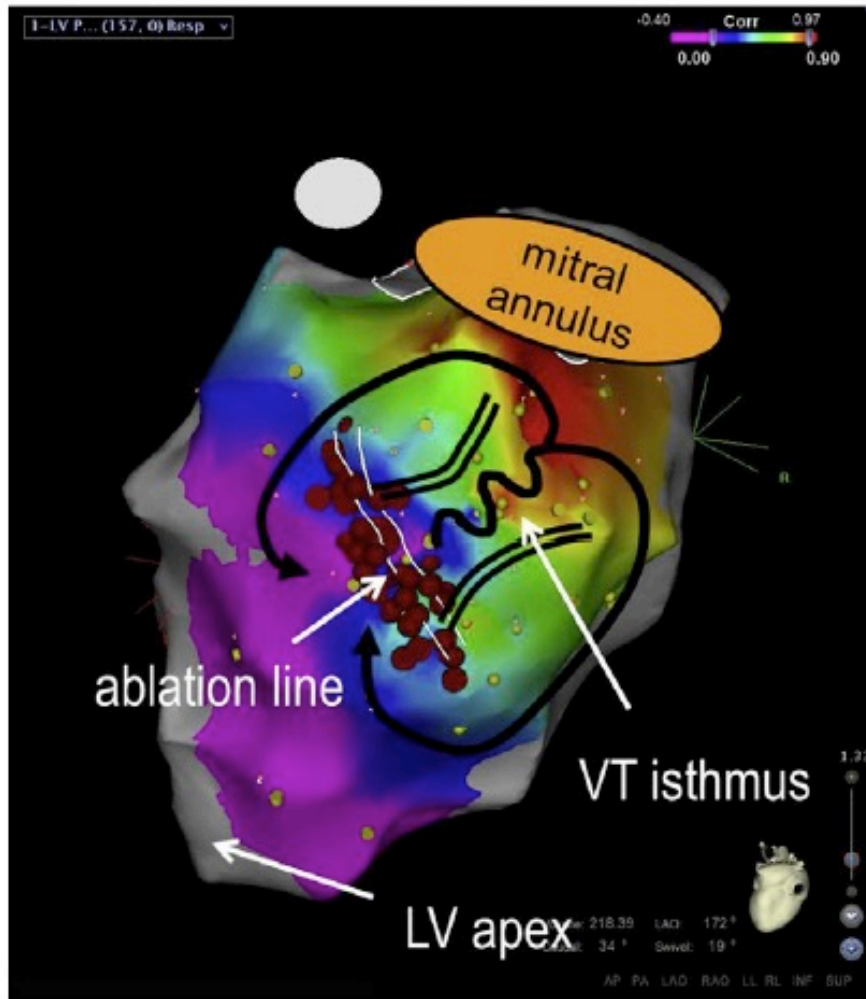




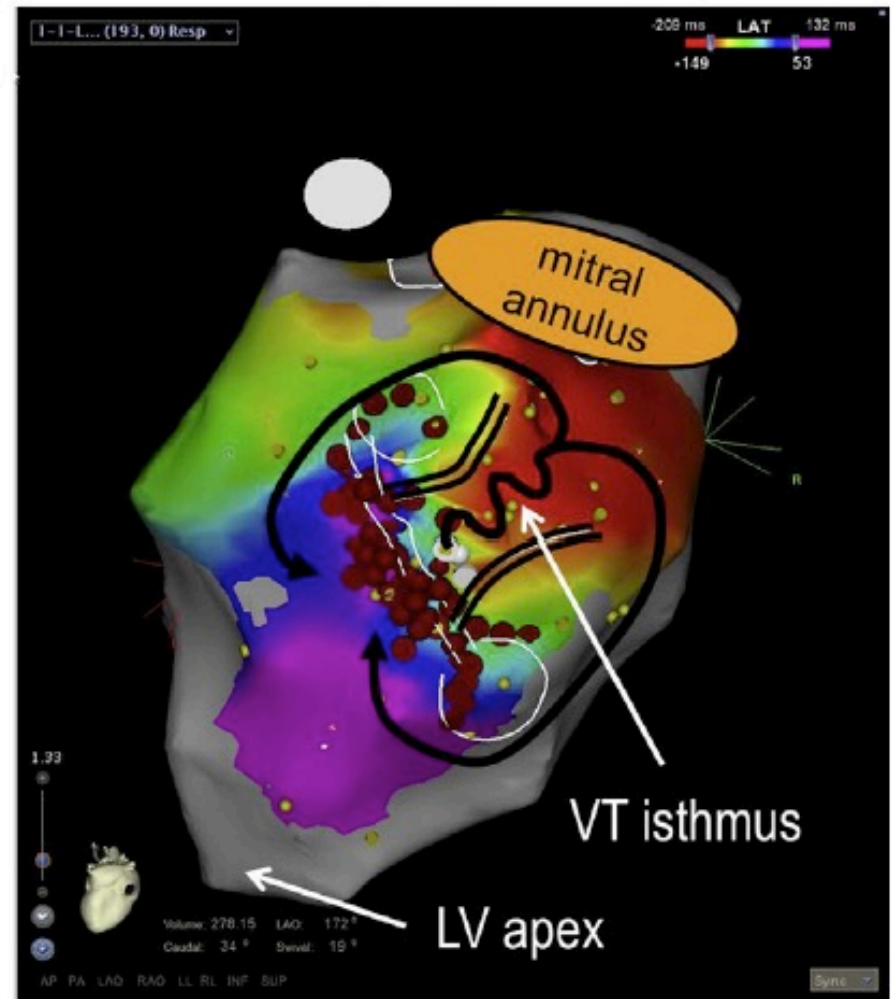




SR sırasında Pace “Map”



VT sırasında Aktivasyon “Map”



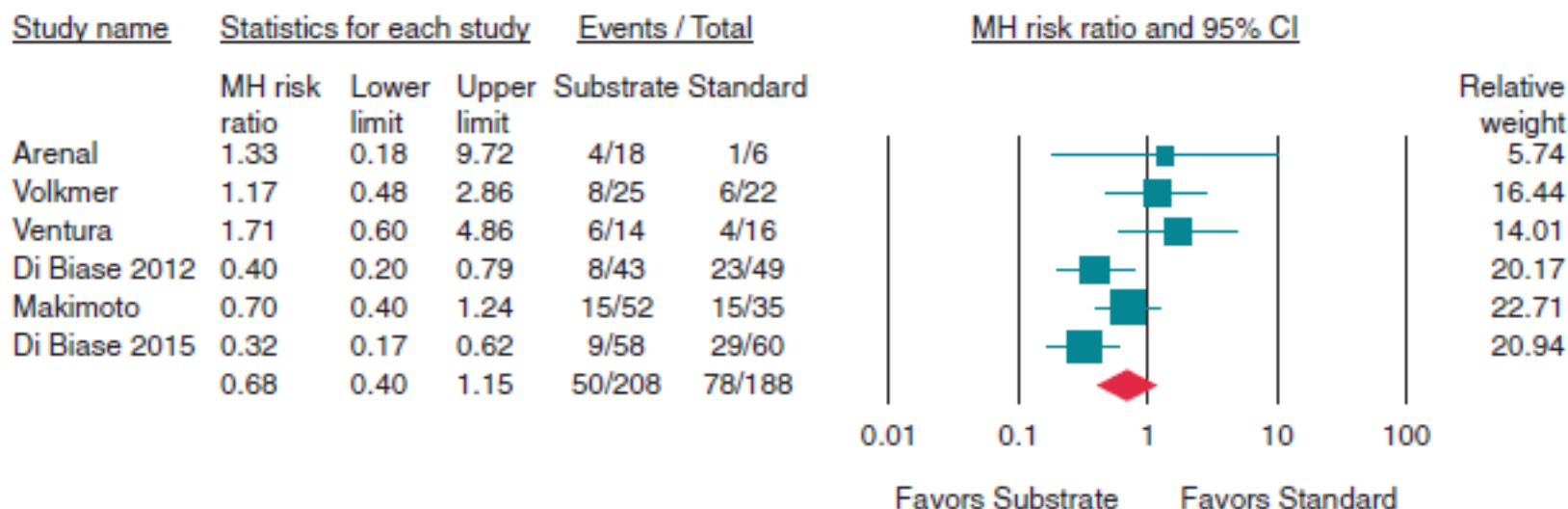
Sınırlılıklar

- Noniskemik KMP'de kullanımı ile ilgili veri yok
- Pace map sırasında gerekli optimal nokta sayısı?
(VT devresi büyüklüğünden etkilenmesi muhtemel)
- Pace morfolojileri arasında transizyon belirgin değilse teknik işe yaramaz
- Spesifik ablasyon sonlanım noktası tanımlanmamış
- Pace mapping rezolüsyonu kısıtlı (~3.5 cm)

Long-term outcomes of different ablation strategies for ventricular tachycardia in patients with structural heart disease: systematic review and meta-analysis

B

Ventricular Arrhythmia Recurrence





Targeting the Hidden Substrate Unmasked by Right Ventricular Extrastimulation Improves Ventricular Tachycardia Ablation Outcome After Myocardial Infarction

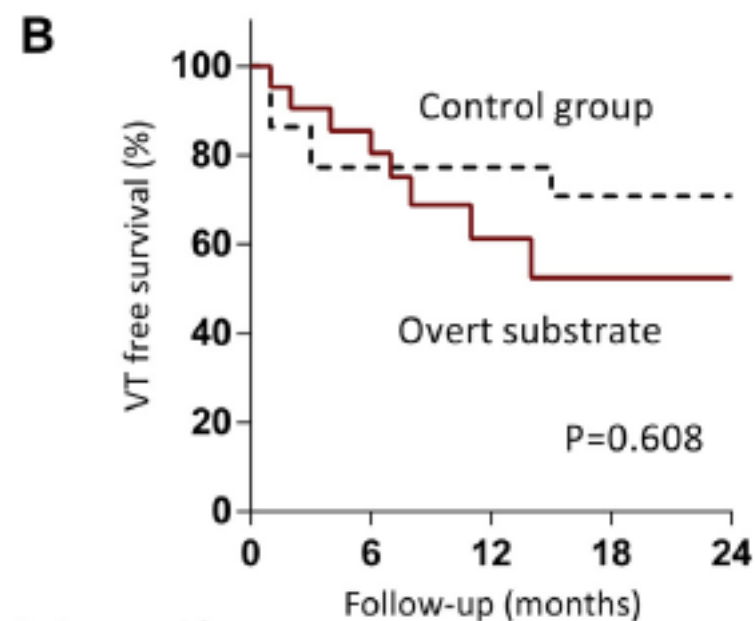
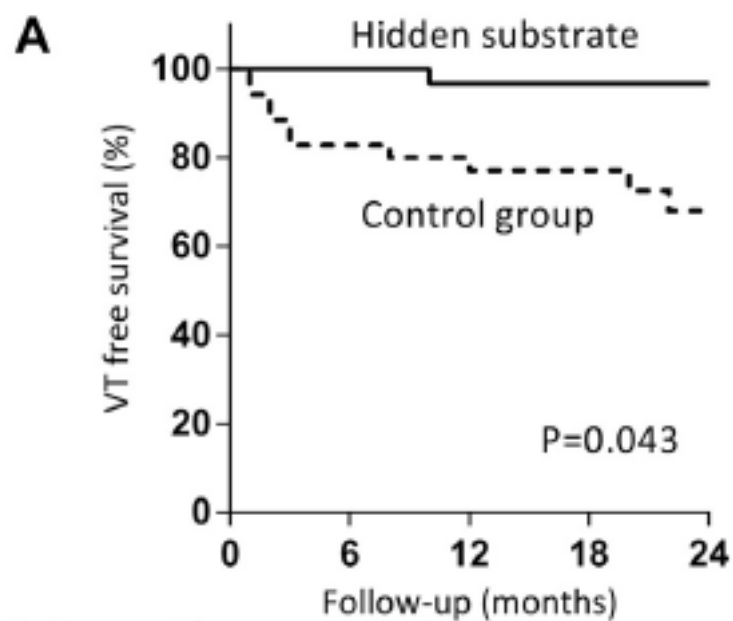
Marta de Riva, MD,^a Yoshihisa Naruse, MD, PhD,^a Micaela Ebert, MD,^a Alexander F.A. Androulakis, MD,^a Qian Tao, PhD,^b Masaya Watanabe, MD, PhD,^a Adrianus P. Wijnmaalen, MD, PhD,^a Jeroen Venlet, MD,^a Charlotte Brouwer, MD,^a Serge A. Trines, MD, PhD,^a Martin J. Schalij, MD, PhD,^a Katja Zeppenfeld, MD, PhD^b

ABSTRACT

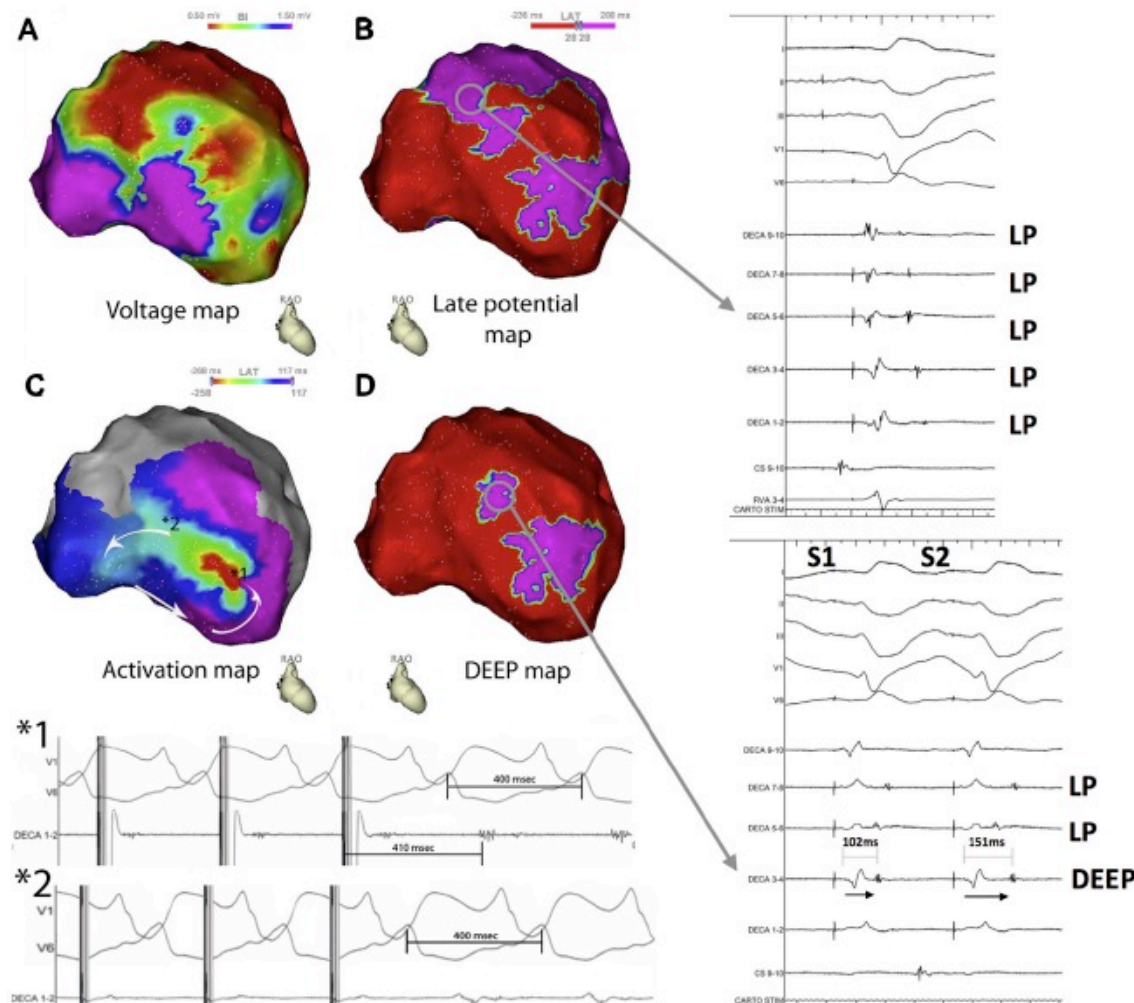
OBJECTIVES This study sought to determine whether ablation of hidden substrate unmasked by right ventricular extrastimulation (RVE) improves ablation outcome of post-myocardial infarction (MI) ventricular tachycardia (VT).

BACKGROUND In patients with small or nontransmural scars after MI, part of the VT substrate may be functional and, in addition, masked by high-voltage far-field signals arising from adjacent normal myocardium.

METHODS In 60 consecutive patients, systematic analysis of electrograms recorded from the presumed infarct area was performed during sinus rhythm, RV pacing at 500 ms, and during a short-coupled RV extrastimulus. Sites showing low-voltage, near-field potentials with evoked conduction delay in response to RVE were targeted.



Multicenter Study of Ischemic Ventricular Tachycardia Ablation With Decrement Evoked Potential (DEEP) Mapping With Extra Stimulus



Sonuçlar

- Son 10 yılda anstabil VTlerin tedavisinde farklı substrat ablasyon yöntemleri geliştirilmiştir
- Bütün yöntemler birbirine benzer prensipleri temel alır.
- Ortak hedef substratta yer alan ve yavaş iletiye işaret eden anormal EGMlerdir
- Bazı yöntemler anormal substratın tamamına yönelik ablasyonu kullanırken, bazıları da VT'ye neden olduğu düşünülen ilgi alanlarının ablasyonuna odaklanır.

Sonuçlar -2-

- Bu çalışmaların kısa ve orta vadede aritmi kontrolündeki başarı oranları birbirine benzer ve olumludur.
- MRG gibi yöntemlerle skarın daha iyi tanımlanması ablasyon başarı oranlarını artırabilir
- VT'yi başlatan ve sürdüren mekanizmaları ve substratı daha iyi anlamamıza yardımcı olacak yeni bilgi ve teknolojilere olan ihtiyaç devam etmektedir.